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Environmental Radiation Data
Report 28: October-December 1981

(U.S.) Office of Radiation Programs
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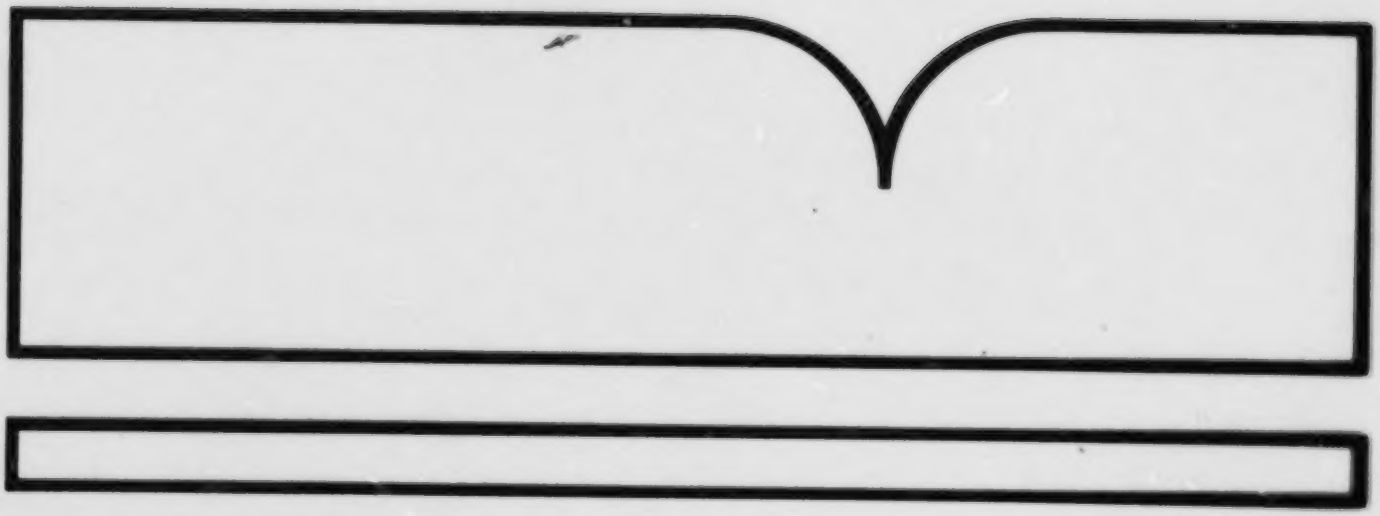

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EPA

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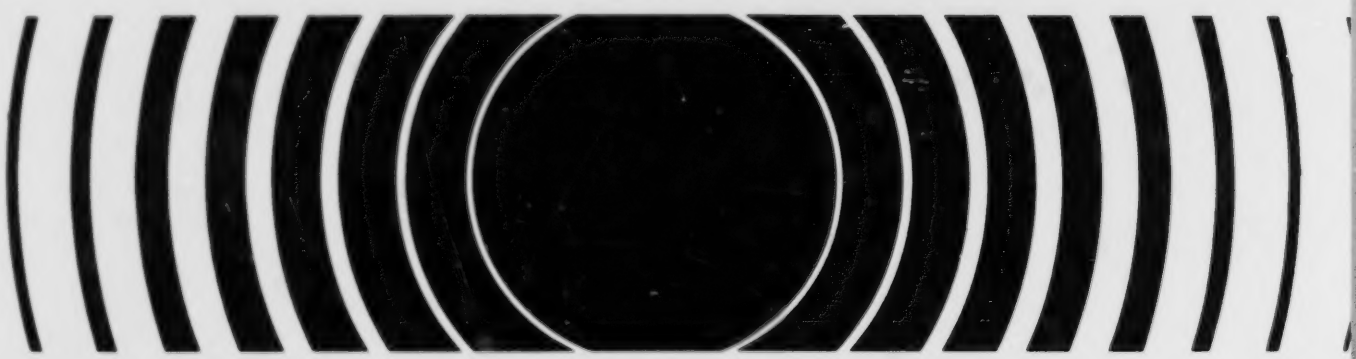

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16. ABSTRACT

Environmental Radiation Data is compiled and distributed quarterly by the Office of Radiation Programs' Eastern Environmental Radiation Facility, Montgomery, Alabama. Sampling locations are selected to provide optimal population coverage while functioning to monitor fallout from nuclear device and other forms of radioactive contamination of the environment. The radiation analyses performed on these samples include gross alpha and gorss beta levels, gamma analyses for fission products and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton and tritium. This monitoring effort also serves to provide ancillary information on releases into the environmenta from stationary sources such as nuclear power reactors, fuel fabrication and reprocessing plants and natural backdground levels.

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E N V I R O N M E N T A L

R A D I A T I O N

D A T A

REPORT 28

September 1982

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Office of Radiation Programs

Environmental Radiation Data (ERD) is compiled and distributed quarterly by the Office of Radiation Programs' Eastern Environmental Radiation Facility (EERF), Montgomery, Alabama. Data from the Environmental Radiation Ambient Monitoring System (ERAMS), and similar networks operated by contributing States, Canada, Mexico, and the Pan American Health Organization are reported in (ERD) when available.

ERAMS was established in 1973 by the U. S. Environmental Protection Agency's Office of Radiation Programs (ORP). The ERAMS is comprised of nationwide sampling stations that provide air, surface, and drinking water and milk samples from which environmental radiation levels are derived. The major emphasis for ERAMS is toward identifying trends in the accumulation of long-lived radionuclides in the environment.

1. Sampling locations are selected to provide optimal population coverage while functioning to monitor fallout from nuclear devices and other forms of radioactive contamination of the environment.

2. The radiation analyses performed on these samples include gross alpha and gross beta levels, gamma analyses for fission products and specific analyses for uranium, plutonium, strontium, iodine, radium, krypton and tritium. This monitoring effort also serves to provide ancillary information on releases into the environment from stationary sources such as nuclear power reactors, fuel fabrication and reprocessing plants and natural background levels.

ENVIRONMENTAL RADIATION DATA

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DATA - Reporting Rationale and Procedures

The intent of EPA's Office of Radiation Programs in establishing the Environmental Radiation Ambient Monitoring System was to provide continuous, accurate and usable environmental radiation data for the public. Therefore, new data reporting procedures were developed to allow better interpretation of the data. The most significant change in this reporting procedure is that all specific radionuclide analyses will be reported as the counting results indicate, whether the number is negative, zero, or positive.

Reporting Rationale

Frequently, concentrations of a radionuclide in environmental media are close to zero. When the actual concentration of a nuclide is zero, the net counting results should statistically show a distribution of negative and positive numbers about zero. This occurs when the background count is subtracted from a sample which has only background activity. Prior to July 1975, ERAMS data were not reported numerically when the results were less than a specified reporting level or minimum detectable level. The present reporting procedure allows all the data to be reported and evaluated statistically without an arbitrary cutoff of small or negative numbers. This approach will facilitate estimates of bias in the nuclide analyses and will allow better evaluation of distributions and trends in environmental data.

When reviewing the data in this report, caution should be exercised in the interpretation of individual negative values. Obviously, a negative activity value does not have physical significance. Such numbers, however, are significant when taken together with other observations which indicate that the true value of a distribution is near zero. When an average of several measurements produces a result less than zero, this indicates a negative bias in the measurement procedure.

(1) Reported Values

Specific Analyses - All specific radionuclide analyses will be reported as the counting results indicate, whether the number is negative, zero, or positive. Numerical values given are as of sample collection date.

Gross Analyses - The actual value of gross radioactivity measurements will be reported, unless the value is below the minimum detectable level (MDL) at the 2 sigma confidence level, then < minimum detectable level will be reported.

MDL is defined as the 3 sigma error of the background. A tabulation of MDL's is given in the following table.

(2) Reported Error Terms

Each reported value for specific analyses will be accompanied by a counting error term at the 2 sigma (95%) confidence interval. Potassium concentrations are determined by specific activity analyses. Error terms are therefore reported as counting errors. At the very low levels characteristic of most ERAMS measurements, counting error is the greatest contributor to overall error.

(3) Significant Figures

All reported values will be rounded to no more than three significant figures. The last significant figure will be increased by one if the figure following is five or greater, otherwise it is left unchanged.

(4) Reporting Levels

The reporting units, smallest increments for reporting, and minimum detectable levels for each isotope are shown in table 1. Smallest increments are sometimes considerably smaller than minimum detectable amounts to avoid truncation errors in averaging.

(5) Averages

Averages will be calculated along with appropriate error terms in an annual summary and analysis of ERAMS data. In calculating these averages, all values of individual data including negative numbers will be utilized. Averages will not be included in ERD quarterly reports.

TABLE 1

ERAMS Reporting Increments and Minimum Detectable Levels

for Radionuclide Analyses

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
Gross alpha	Water	pCi/l	1 pCi/l	2 pCi/l
Gross beta	Air	pCi/m^3	.01 pCi/m^3	.01 pCi/m^3
	Water	pCi/l	1 pCi/l	1 pCi/l
	Precipitation	nCi/m^2	.01 nCi/m^2	.01 nCi/m^2(a)
Tritium	Water	nCi/l	.1 nCi/l	.2 nCi/l
	Milk	nCi/l	.1 nCi/l	.2 nCi/l
Carbon-14	Milk	pCi/l	1 pCi/l	15 pCi/l
Krypton-85	Ambient Air	pCi/m^3	.1 pCi/m^3	2 pCi/m^3
Plutonium-238, 239	Air	aCi/m^3	.1 aCi/m^3	.015 pCi(b) per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Uranium-234, 235,238	Air	aCi/m^3	.1 aCi/m^3	.015 pCi(b) per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Radium-226	Water	pCi/l	.1 pCi/l	.1 pCi/l
Strontium-90	Milk	pCi/l	.1 pCi/l	1 pCi/l
	Water	pCi/l	.1 pCi/l	1 pCi/l

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
Strontium-89	Milk	pCi/l	1 pCi/l	5 pCi/l(c)
Iodine-131	Milk	pCi/l	1 pCi/l	10 pCi/l(c)
	Water	pCi/l	1 pCi/l	10 pCi/l(c)
	Water (specific radiochemical analysis)	pCi/l	.1 pCi/l	.4 pCi/l
Iodine-129	Milk	fCi/l	.1 fCi/l	.4 fCi/l
Iodine-127	Milk	g/l	10 g/l	10 g/l
Cesium-137	Milk	pCi/l	1 pCi/l	10 pCi/l
	Water	pCi/l	1 pCi/l	10 pCi/l
Barium-140	Milk	pCi/l	1 pCi/l	10 pCi/l(c)
	Water	pCi/l	1 pCi/l	10 pCi/l(c)
Potassium	Milk	g/l	.1 g/l	.12 g/l
	Water	g/l	.1 g/l	.12 g/l
Potassium-40	Water	pCi/l	1 pCi/l	100 pCi/l

(a) The value in terms of nCi/m^2 would be dependent on precipitation (mm).
(b) This value in terms of pCi/m^3 would be dependent on the air volume.
(c) Activity as of the day of counting.

ENVIRONMENTAL RADIATION AMBIENT MONITORING SYSTEM (ERAMS)

SECTION I. Air Program

Airborne Particulates and Precipitation

Gross beta radioactivity measurements and certain specific analyses are performed on air particulates and precipitation samples as indicator measurements in assessing the general (national) impact of all contributing sources on environmental levels of radiation.

Airborne particulates are collected continuously at field stations representing wide geographic coverage, including present and potential sources of environmental radioactivity. Sampling sites are located throughout the United States, Virgin Islands, and the Panama Canal.

Filters (10-cm charcoal impregnated cellulose) from air samplers are changed twice weekly and field measurements are made with a G-M survey meter at 5 hours and 29 hours after collection to allow for radon and thoron daughter product decay. Field estimates are reported to appropriate EPA officials by telephone or mail depending on the activity levels found.

The filters are sent to EERF for more sensitive analyses in a low background beta counter. Gamma scans are performed on all filters showing laboratory gross beta counts greater than 1 pCi/m^3. The lower gross beta values reported for laboratory measurements are largely due to the decay of radionuclides which occurred between the times of the field estimates and laboratory measurements.

Precipitation samples are collected at the field stations where air filters are collected. These samples are also sent to EERF where they are composited monthly for tritium, gross beta activity measurements and gamma scans.

These locations also correspond to airborne particulate and drinking water sampling locations selected for plutonium analyses. Plutonium-238, -239, and uranium-234, -235, and -238 analyses are performed annually on precipitation samples collected during March - May.

Tables 2 - 4 present the monthly average gross beta concentrations in airborne particulates for October - December 1981.

Tables 5 - 7 present the monthly average gross beta concentration and any specific gamma concentrations for precipitation samples for October - December 1981. A compilation of individual measurements is available from the EPA, EERF, Montgomery, AL 36193.

The tritium in precipitation samples for October - December 1981 at the selected stations are shown in Table 8.

TABLE 2

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
OCTOBER 1981

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	9	0.6	0.2	0.4	0.02	0.01	0.01
CA:BERKELEY	4	0.1	0.1	0.1	0.02	0.01	0.01
CA:LOS ANGELES	9	1.4	0.4	0.8	0.04	0.01	0.02
CT:HARTFORD	10	1.2	0.1	0.3	0.02	0.01	0.01
FL:JACKSONVILLE	6	0.3	0.1	0.2	0.03	0.01	0.02
FL:MIAMI	4	0.4	0.1	0.2	0.02	0.01	0.02
ID:BOISE	10	0.8	0.3	0.5	0.04	0.01	0.02
ID:IDAHO FALLS	9	NM	NM	NM	0.04	0.01	0.02
IL:CHICAGO	8	0.4	0.1	0.2	0.03	0.01	0.02
IN:INDIANAPOLIS	9	0.5	0.2	0.3	0.03	0.01	0.02
KS:TOPEKA	8	0.7	0.3	0.5	0.01	0.01	0.01
ME:AUGUSTA	9	0.6	0.1	0.2	0.02	0.01	0.01
MI:LANSING	7	0.2	0.1	0.1	0.02	0.01	0.01
MN:MINNEAPOLIS	9	0.6	0.1	0.2	0.03	0.01	0.02
MO:JEFFERSON CITY	9	0.6	0.1	0.4	0.04	0.01	0.02
MS:JACKSON	9	0.7	0.1	0.3	0.02	0.02	0.02
ND:BISMARCK	9	1.4	0.3	0.7	0.02	0.01	0.01
NJ:TRENTON	9	1.7	0.1	0.7	0.02	0.01	0.01
NM:SANTA FE	5	1.1	0.4	0.7	0.02	0.01	0.02
NV:LAS VEGAS	9	1.0	0.3	0.7	0.03	0.01	0.02
NY:ALBANY	7	0.4	0.1	0.2	0.02	0.01	0.01
NY:NEW YORK CITY	9	0.2	0.1	0.1	0.03	0.01	0.01
NY:NIAGARA FALLS	9	0.2	0.1	0.1	0.02	0.01	0.01
NY:YAPHANK	9	0.3	0.1	0.1	0.02	0.01	0.01
OH:COLUMBUS	7	1.0	0.2	0.5	0.04	0.02	0.03
OH:PAINESVILLE	7	0.3	0.1	0.2	0.02	0.01	0.01
OH:TOLEDO	9	1.7	0.1	0.5	0.03	0.01	0.02
OK:OKLAHOMA CITY	10	2.2	0.1	0.9	0.03	0.01	0.02
OR:PORTLAND	8	NM	NM	NM	0.02	0.01	0.01
PA:HARRISBURG	11	1.6	0.1	0.7	0.02	0.01	0.01
PA:PITTSBURGH	8	0.3	0.1	0.2	0.02	0.01	0.01
RI:PROVIDENCE	8	1.9	0.1	0.4	0.04	0.01	0.02
SC:BARNWELL	2	NM	NM	NM	0.01	0.01	0.01
SC:COLUMBIA	9	1.4	0.1	0.7	0.06	0.01	0.03
TN:KNOXVILLE	4	0.7	0.1	0.4	0.06	0.02	0.03
VA:LYNCHBURG	9	1.4	0.1	0.6	0.02	0.01	0.01
VA:VIRGINIA BEACH	2	NM	NM	NM	0.01	0.01	0.01
WA:SEATTLE	8	0.1	0.1	0.1	0.01	0.01	0.01
WA:SPOKANE	6	1.3	0.2	0.6	0.02	0.01	0.01
WI:MADISON	9	0.4	0.1	0.2	0.03	0.01	0.02
WV:CHARLESTON	5	1.5	0.1	0.8	0.02	0.01	0.02

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m^3

NM NO MEASUREMENT

TABLE 3

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
NOVEMBER 1981

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	8	1.2	0.3	0.5	0.02	0.01	0.01
CA:LOS ANGELES	7	1.0	0.3	0.7	0.03	0.01	0.02
CT:HARTFORD	9	0.4	0.1	0.2	0.02	0.01	0.01
FL:JACKSONVILLE	6	0.4	0.1	0.2	0.03	0.01	0.02
ID:BOISE	9	0.8	0.1	0.3	0.04	0.01	0.02
ID:IDAHO FALLS	9	NM	NM	NM	0.07	0.01	0.02
IL:CHICAGO	6	0.5	0.1	0.2	0.02	0.02	0.02
IN:INDIANAPOLIS	8	0.7	0.4	0.5	0.04	0.01	0.02
KS:TOPEKA	8	0.5	0.2	0.4	0.01	0.01	0.01
ME:AUGUSTA	9	0.3	0.1	0.1	0.02	0.01	0.01
MI:LANSING	9	0.6	0.1	0.3	0.02	0.01	0.01
MN:MINNEAPOLIS	8	1.4	0.1	0.7	0.04	0.01	0.03
MO:JEFFERSON CITY	8	0.8	0.1	0.5	0.02	0.01	0.02
MS:JACKSON	8	0.9	0.3	0.6	0.06	0.01	0.03
NC:CHARLOTTE	4	0.2	0.2	0.2	0.03	0.01	0.02
ND:BISMARCK	7	2.2	0.1	1.0	0.03	0.01	0.02
NJ:TRENON	1	0.4	0.1	0.1	0.02	0.01	0.01
NJ:TRENTON	8	2.6	0.1	0.6	0.03	0.01	0.02
NM:SANTA FE	6	0.8	0.1	0.5	0.03	0.01	0.02
NV:LAS VEGAS	9	1.4	0.3	0.8	0.03	0.01	0.02
NY:ALBANY	8	0.4	0.1	0.2	0.03	0.01	0.02
NY:NEW YORK CITY	7	0.2	0.1	0.1	0.02	0.01	0.01
NY:NIAGARA FALLS	7	0.2	0.1	0.1	0.02	0.01	0.01
NY:YAPHANK	6	0.2	0.1	0.1	0.02	0.01	0.01
OH:COLUMBUS	8	1.8	0.2	0.9	0.03	0.01	0.03
OH:PAINESVILLE	8	0.4	0.1	0.2	0.02	0.01	0.02
OH:TOLEDO	8	1.1	0.3	0.6	0.03	0.02	0.02
OK:OKLAHOMA CITY	8	1.4	0.1	0.6	0.03	0.01	0.02
OR:PORTLAND	6	NM	NM	NM	0.03	0.01	0.01
PA:HARRISBURG	12	1.0	0.1	0.5	0.02	0.01	0.02
PA:PITTSBURGH	9	0.7	0.2	0.4	0.06	0.01	0.02
RI:PROVIDENCE	7	0.9	0.1	0.2	0.02	0.01	0.01
SC:BARNWELL	2	0.1	0.1	0.1	0.01	0.01	0.01
SC:COLUMBIA	8	1.1	0.4	0.8	0.05	0.02	0.03
TX:EL PASO	3	1.0	0.6	0.7	0.04	0.02	0.03
VA:LYNCHBURG	9	1.0	0.1	0.6	0.04	0.01	0.02
WA:SEATTLE	7	0.1	0.1	0.1	0.02	0.01	0.01
WA:SPOKANE	9	0.8	0.2	0.4	0.03	0.01	0.01
WI:MADISON	6	0.7	0.1	0.3	0.03	0.01	0.02
WV:CHARLESTON	6	1.5	0.3	0.9	0.03	0.01	0.02

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m^3

NM NO MEASUREMENT

TABLE 4

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
DECEMBER 1981

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	10	0.4	0.1	0.2	0.03	0.01	0.01
CA:LOS ANGELES	10	1.3	0.3	0.9	0.03	0.01	0.02
CT:HARTFORD	9	0.2	0.1	0.1	0.02	0.01	0.01
FL:JACKSONVILLE	8	0.8	0.1	0.3	0.03	0.01	0.02
FL:MIAMI	9	0.1	0.1	0.1	0.03	0.01	0.01
ID:BOISE	9	0.3	0.1	0.2	0.02	0.01	0.01
ID:IDAHO FALLS	9	NM	NM	NM	0.02	0.01	0.01
IL:CHICAGO	8	0.3	0.1	0.2	0.03	0.01	0.02
IN:INDIANAPOLIS	7	0.6	0.2	0.4	0.02	0.01	0.02
KS:TOPEKA	8	0.9	0.2	0.5	0.02	0.01	0.01
ME:AUGUSTA	9	0.1	0.1	0.1	0.02	0.01	0.01
MI:LANSING	9	0.3	0.1	0.1	0.05	0.01	0.02
MN:MINNEAPOLIS	9	0.2	0.1	0.1	0.03	0.02	0.02
MO:JEFFERSON CITY	9	0.6	0.1	0.3	0.03	0.01	0.02
MS:JACKSON	9	0.5	0.1	0.3	0.02	0.02	0.02
NC:CHARLOTTE	5	0.3	0.2	0.2	0.02	0.01	0.01
ND:BISMARCK	10	0.9	0.1	0.3	0.03	0.01	0.02
NJ:TRENTON	6	0.4	0.1	0.2	0.01	0.01	0.01
NM:SANTA FE	8	1.1	0.2	0.6	0.02	0.01	0.01
NV:LAS VEGAS	8	1.9	0.4	1.3	0.04	0.02	0.02
NY:ALBANY	9	0.3	0.1	0.1	0.02	0.01	0.01
NY:NEW YORK CITY	9	0.1	0.1	0.1	0.02	0.01	0.01
NY:NIAGARA FALLS	9	0.1	0.1	0.1	0.03	0.01	0.01
NY:SYRACUSE	7	0.5	0.1	0.1	0.02	0.01	0.01
NY:YAPHANK	9	0.4	0.1	0.1	0.02	0.01	0.01
OH:COLUMBUS	9	0.3	0.1	0.2	0.03	0.01	0.02
OH:PAINESVILLE	10	0.2	0.1	0.1	0.02	0.01	0.02
OH:TOLEDO	9	0.6	0.1	0.3	0.03	0.01	0.02
OK:OKLAHOMA CITY	5	3.3	0.6	1.5	0.03	0.01	0.02
OR:PORTLAND	10	NM	NM	NM	0.03	0.01	0.01
PA:HARRISBURG	13	0.6	0.1	0.2	0.03	0.01	0.02
PA:PITTSBURGH	7	0.1	0.1	0.1	0.02	0.01	0.01
RI:PROVIDENCE	6	0.2	0.1	0.1	0.02	0.01	0.01
SC:BARNWELL	3	0.1	0.1	0.1	0.01	0.01	0.01
SC:COLUMBIA	8	0.6	0.1	0.4	0.04	0.01	0.02
TX:EL PASO	9	2.6	0.7	1.1	0.04	0.01	0.02
VA:LYNCHBURG	7	0.6	0.1	0.3	0.09	0.01	0.02
WA:SEATTLE	7	0.1	0.1	0.1	0.01	0.01	0.01
WA:SPOKANE	8	0.2	0.1	0.1	0.02	0.01	0.01
WI:MADISON	8	0.4	0.1	0.2	0.03	0.01	0.02
WV:CHARLESTON	3	0.5	0.3	0.4	0.01	0.01	0.01

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m^3

NM NO MEASUREMENT

TABLE 5

GROSS BETA CONCENTRATION IN PRECIPITATION

OCTOBER 1981

LOCATION	DEPTH	ACT. ± 2s		SPECIFIC GAMMA ACT.
	(mm)	(nCi/m^2)		(pCi/l)
AL:MONTGOMERY	62.5	0.13	0.03	ND
CA:BERKELEY	17.0	0.05	0.01	ND
CO:DENVER	20.3	0.10	0.02	ND
CT:HARTFORD	53.0	0.18	0.03	ND
FL:JACKSONVILLE	23.8	0.05	0.01	ND
FL:MIAMI	12.5	0.01	0.01	ND
ID:BOISE	31.0	0.07	0.02	ND
ID:IDAHO FALLS	28.5	0.15	0.02	ND
IL:CHICAGO	41.6	0.14	0.03	ND
MI:LANSING	65.9	0.13	0.04	ND
MS:JACKSON	12.1	0.02	0.01	ND
MT:HELENA	19.4	0.05	0.01	ND
ND:BISMARCK	18.0	0.03	0.01	ND
NJ:TRENTON	45.0	0.11	0.03	ND
NY:NEW YORK CITY	33.6	0.11	0.02	ND
NY:NIAGARA FALLS	74.0	0.07	0.04	ND
OH:COLUMBUS	16.3	0.03	0.01	ND
OH:PAINESVILLE	4.4	0.03	0.00	ND
OR:PORTLAND	101.3	0.25	0.06	ND
PA:HARRISBURG	50.4	0.86	0.06	ND
PA:PITTSBURGH	33.8	0.06	0.02	ND
SC:BARNWELL	32.5	0.41	0.04	ND
SC:COLUMBIA	40.0	0.20	0.03	ND
VA:LYNCHBURG	49.3	0.44	0.05	ND
VA:VIRGINIA BEACH	12.5	0.05	0.01	ND
WV:CHARLESTON	32.5	0.43	0.04	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 6

GROSS BETA CONCENTRATION IN PRECIPITATION

NOVEMBER 1981

LOCATION	DEPTH (mm)	ACT. ± 2s (nCi/m^2)		SPECIFIC GAMMA ACT. (pCi/l)
AL:MONTGOMERY	22.5	0.05	0.01	ND
CA:BERKELEY	34.8	0.02	0.01	ND
CA:LOS ANGELES	44.5	0.12	0.03	ND
CT:HARTFORD	20.0	0.06	0.01	ND
FL:JACKSONVILLE	72.3	0.07	0.03	ND
ID:BOISE	72.7	0.06	0.03	ND
IL:CHICAGO	31.5	0.06	0.02	ND
MI:LANSING	34.4	0.09	0.02	ND
MS:JACKSON	5.3	0.01	0.00	ND
ND:BISMARCK	13.9	0.05	0.01	ND
NJ:TRENTON	24.0	0.02	0.01	ND
NY:NEW YORK CITY	15.1	0.03	0.01	ND
NY:NIAGARA FALLS	44.4	0.07	0.03	ND
OH:COLUMBUS	26.6	0.05	0.01	ND
OH:PAINESVILLE	56.2	0.01	0.02	ND
OR:PORTLAND	168.0	0.17	0.08	ND
PA:HARRISBURG	29.6	0.03	0.01	ND
SC:COLUMBIA	16.3	0.03	0.01	ND
VA:LYNCHBURG	29.5	0.24	0.03	ND
WV:CHARLESTON	15.0	0.02	0.01	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 7

GROSS BETA CONCENTRATION IN PRECIPITATION

DECEMBER 1981

LOCATION	DEPTH (mm)	ACT. ± 2s (nCi/m^2)		SPECIFIC GAMMA ACT. (pCi/l)
CA:BERKELEY	25.3	0.01	0.01	ND
CO:DENVER	16.0	0.08	0.01	ND
CT:HARTFORD	50.2	0.09	0.03	ND
FL:JACKSONVILLE	67.1	0.07	0.03	ND
ID:BOISE	70.7	0.11	0.04	ND
ID:IDAHO FALLS	76.8	0.50	0.06	ND
IL:CHICAGO	22.5	0.09	0.02	ND
MI:LANSING	13.6	0.07	0.01	ND
MS:JACKSON	9.4	0.04	0.01	ND
ND:BISMARCK	13.5	0.12	0.01	ND
NJ:TRENTON	59.3	0.13	0.03	ND
NY:NEW YORK CITY	41.0	0.05	0.02	ND
NY:NIAGARA FALLS	8.4	0.09	0.01	ND
OH:PAINESVILLE	79.0	0.19	0.04	ND
OR:PORTLAND	195.3	0.15	0.08	ND
PA:HARRISBURG	32.1	0.02	0.01	ND
PA:PITTSBURGH	48.8	0.06	0.03	ND
SC:BARNWELL	42.5	0.12	0.03	ND
SC:COLUMBIA	186.3	0.19	0.08	ND
VA:LYNCHBURG	39.4	0.09	0.02	ND
WV:CHARLESTON	13.3	0.10	0.01	ND

ND NO GAMMA ACTIVITY DETECTABLE
s SIGMA COUNTING ERROR

TABLE 8

PRECIPITATION
TRITIUM CONCENTRATION

OCTOBER - DECEMBER 1981

LOCATION	OCTOBER nCi/l ± 2s	NOVEMBER nCi/l ± 2s	DECEMBER nCi/l ± 2s
AL:MONTGOMERY	0.2 0.2	0.2 0.2	NS
CA:BERKELEY	0.3 0.2	0.1 0.2	0.3 0.2
CA:LOS ANGELES	NS	0.2 0.2	NS
CO:DENVER	0.3 0.2	NS	0.3 0.2
CT:HARTFORD	0.6 0.2	0.3 0.2	0.2 0.2
FL:JACKSONVILLE	0.3 0.2	0.2 0.2	0.2 0.2
FL:MIAMI	0.4 0.2	NS	NS
ID:BOISE	0.3 0.2	0.3 0.2	0.3 0.2
ID:IDAHO FALLS	0.2 0.2	NS	0.3 0.2
IL:CHICAGO	0.3 0.2	0.5 0.2	0.2 0.2
MI:LANSING	0.3 0.2	0.3 0.2	0.2 0.2
MS:JACKSON	0.3 0.2	0.3 0.2	0.3 0.2
MT:HELENA	0.2 0.2	NS	NS
ND:BISMARCK	0.3 0.2	0.2 0.2	0.3 0.2
NJ:TRENTON	0.4 0.2	0.3 0.2	0.4 0.2
NY:NEW YORK CITY	0.6 0.2	0.3 0.2	0.2 0.2
NY:NIAGARA FALLS	0.4 0.2	0.4 0.2	0.3 0.2
OH:COLUMBUS	0.2 0.2	0.3 0.2	NS
OH:PAINESVILLE	0.3 0.2	0.4 0.2	0.2 0.2
OR:PORTLAND	0.1 0.2	0.3 0.2	0.3 0.2
PA:HARRISBURG	0.3 0.2	0.3 0.2	0.2 0.2
PA:PITTSBURGH	0.3 0.2	NS	0.2 0.2
SC:BARNWELL	0.5 0.2	NS	1.7 0.2
SC:COLUMBIA	0.5 0.2	0.8 0.2	1.0 0.2
VA:LYNCHBURG	0.3 0.2	0.3 0.2	0.4 0.2
VA:VIRGINIA BEACH	0.5 0.2	NS	NS
WV:CHARLESTON	0.4 0.2	0.2 0.2	0.3 0.2

NS NO SAMPLE
s SIGMA COUNTING ERROR

Plutonium and Uranium in Airborne Particulates

Environmental radiation levels of plutonium and uranium are determined by the analyses of quarterly composite samples (air filters) collected from the continuously operating airborne particulate samplers. The number of continuously operating stations is being increased from the original 22 will eventually number 67 when all equipment is operational.

Analyses of the composited filters consist of ashing, separating by liquid ion exchange, and coprecipitation of the plutonium or uranium.

Concentration of the specific isotopes of plutonium-238, -239, and uranium-234, -235, and -238 are determined by alpha spectroscopy. The volume of air analyzed normally ranges from 25,000 to 40,000 m^3 for each quarterly composite.

Plutonium and uranium in airborne particulates data for July - September 1981 are shown for the 42 stations operating during this period in Table 9.

TABLE 9

PLUTONIUM AND URANIUM IN AIRBORNE PARTICULATES
JULY - SEPTEMBER 1981 COMPOSITES

LOCATION	^{238}Pu aCi/m^3±2s	^{239}Pu aCi/m^3±2s	^{234}U aCi/m^3±2s	^{235}U aCi/m^3±2s	^{238}U aCi/m^3±2s
AL:MONTGOMERY	1.0 0.6	6.7 1.3	9.7 1.9	1.0 0.5	9.7 1.9
CA:BERKELEY	0.7 0.6	5.8 1.3	7.7 2.1	0.4 0.4	6.3 1.8
CA:LOS ANGELES	0.3 1.0	10.2 2.5	30.5 5.4	1.6 0.9	32.0 5.5
CT:HARTFORD	0.5 0.8	11.7 2.4	25.0 3.6	1.3 0.6	10.0 1.9
FL:JACKSONVILLE	-0.2 0.9	6.7 1.7	20.3 4.2	1.7 1.0	16.6 3.7
FL:MIAMI	0.1 0.8	6.6 1.7	27.1 3.9	1.6 0.7	15.5 2.6
ID:BOISE	2.5 1.5	16.4 3.5	40.8 6.2	4.2 1.5	31.6 5.2
ID:IDAHO FALLS	13.1 3.7	19.0 4.5	65.3 8.9	3.1 1.2	56.7 7.9
IL:CHICAGO	1.3 1.9	14.1 3.4	46.0 7.6	2.3 1.2	21.2 4.4
IN:INDIANAPOLIS	0.5 1.2	10.6 2.6	46.5 7.5	1.1 1.1	34.5 6.0
KS:TOPEKA	0.6 0.4	3.6 0.7	9.6 1.6	0.6 0.4	9.5 1.6
ME:AUGUSTA	0.0 0.7	13.0 2.2	19.2 3.0	1.4 0.6	11.4 2.0
MI:LANSING	0.5 0.6	12.1 2.2	23.5 3.8	1.1 0.6	19.8 3.3
MN:MINNEAPOLIS	1.2 1.1	9.9 2.2	30.1 5.8	3.4 1.5	19.8 4.3
MS:JACKSON	1.9 0.9	8.5 1.7	17.8 3.0	0.6 0.5	16.6 2.8
MT:HELENA	1.2 1.1	17.1 3.7	48.1 9.9	4.2 2.3	35.1 7.8
NC:CHARLOTTE	0.3 0.9	14.9 3.2	34.7 4.5	2.8 0.8	29.5 4.0
ND:BISMARCK	1.8 1.3	13.2 2.7	27.5 4.9	1.2 1.0	28.9 5.0
NJ:TRENTON	0.6 0.8	17.1 3.1	25.3 4.2	2.4 1.1	25.1 4.2
NM:SANTA FE	1.5 0.8	7.3 1.6	26.8 4.3	3.1 1.1	20.1 3.4
NV:LAS VEGAS	10.2 3.8	11.3 3.5	77.9 13.5	3.2 1.9	55.8 10.4
NY:ALBANY	1.3 0.9	12.2 2.6	36.0 4.8	1.5 0.7	15.4 2.6
NY:NEW YORK CITY	1.0 0.7	24.6 3.8	9.8 1.9	0.7 0.4	8.2 1.6
NY:NIAGARA FALLS	0.5 0.9	13.3 2.5	46.0 7.7	2.8 1.3	43.9 7.4
NY:YAPHANK	0.4 0.3	12.1 1.7	6.4 1.0	0.7 0.3	5.0 0.8
OH:COLUMBUS	1.4 0.7	15.4 2.3	76.1 9.2	4.3 1.2	67.6 8.3
OH:PAINESVILLE	0.6 0.9	11.8 2.4	37.0 6.5	1.3 1.0	23.4 4.7
OH:TOLEDO	1.1 1.2	12.4 2.7	58.3 9.5	3.1 1.5	39.8 7.1
OK:OKLAHOMA CITY	0.5 1.2	10.0 2.5	36.5 7.0	1.7 1.4	34.9 6.7
OR:PORTLAND	1.9 1.0	8.8 2.4	21.8 4.2	1.1 0.9	23.6 4.4
PA:HARRISBURG	0.9 0.5	11.5 1.6	23.7 3.7	1.5 0.7	18.6 3.1
PA:PITTSBURGH	0.6 1.1	13.2 2.8	45.7 6.9	2.6 1.2	46.2 7.0
RI:PROVIDENCE	-0.2 0.6	11.4 2.0	19.0 3.1	1.5 0.7	9.8 1.9
SC:BARNWELL	1.6 1.0	12.1 2.3	25.9 3.9	1.0 0.5	8.4 1.8
SC:COLUMBIA	0.8 0.8	7.1 1.5	31.7 5.1	2.7 1.0	24.3 4.1
TN:KNOXVILLE	0.1 0.4	8.7 1.4	23.8 2.9	1.6 0.5	19.2 2.5
VA:LYNCHBURG	0.7 0.5	8.3 1.4	96.0 13.2	2.0 0.9	10.7 2.4
VA:VIRGINIA BEACH	1.0 0.6	6.6 1.3	24.5 3.9	1.1 0.6	22.1 3.6
WA:SEATTLE	0.7 0.7	6.7 1.5	13.7 3.2	0.8 0.8	9.5 2.5
WA:SPOKANE	3.5 1.5	13.6 2.8	49.5 7.8	2.7 1.3	55.6 8.5
WI:MADISON	0.6 0.5	11.8 2.0	24.1 3.6	0.5 0.4	18.0 2.9
WV:CHARLESTON	0.3 0.5	9.9 1.7	22.8 3.3	1.5 0.6	18.5 2.9

PLUTONIUM RATIOS ARE CALCULATED ON UNROUNDED RAW VALUES.
THE ^{238}Pu AND ^{239}Pu CONCENTRATIONS REPORTED IN THIS TABLE HAVE BEEN ROUNDED.

s SIGMA COUNTING ERROR

Krypton-85

Krypton-85 is a long-lived noble gas with a half life of 10.8 years. It is released into the atmosphere by nuclear reactor operations, fuel fabrication, fuel reprocessing, and nuclear detonations. Krypton-85 also occurs naturally in minor quantities primarily from the neutron capture of stable krypton-84 as well as spontaneous fission and neutron-induced fission of uranium. Monitoring of krypton-85 in the atmosphere has been conducted to identify and establish baseline levels and long-term trends.

Krypton-85 analysis began in January 1973 with sample collections and analyses being performed for 12 sampling locations. These locations were selected to provide atmospheric coverage of the United States with considerations being given to the proximity to fuel reprocessing plants, nuclear reactors, and wide geographic coverage.

Dry compressed air samples, collected at each location, are purchased from commercial air suppliers semiannually and shipped to the EERF where the krypton-85 is cryogenically separated and counted in a liquid scintillation system.

Data for January - June 1976 were reported in ERD 8.

ERAMS

SECTION II. Water Program

The ERAMS water program provides ambient radiation data to assess the effects of the nuclear power industry, the natural radiation environment, and other nuclear sources on the nation's rivers, streams and drinking water supplies.

Surface Water

Grab samples are taken quarterly at 58 stations located downstream from operating or future nuclear facilities.

Surface water monitoring consists of tritium analyses quarterly and gamma scans annually. Tritium is the primary radioactive pollutant from nuclear power plants.

Tritium concentrations are determined by liquid scintillation counting of distilled samples. Gamma scans are performed annually to determine if there is a buildup of other contaminants.

Tritium concentrations for surface water samples for October - December 1981 are given in Table 10.

TABLE 10

SURFACE WATER
TRITIUM CONCENTRATION

OCTOBER - DECEMBER 1981

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± 2s
AL:DECATUR	TENNESSEE RIVER	10/ 8/81	0.2	0.2
AL:DOTHAN	CHATTAHOOCHIE RIVER	10/ 1/81	0.6	0.2
AL:SCOTTSBORO	TENNESSEE RIVER	10/ 8/81	0.2	0.2
AR:LITTLE ROCK	ARKANSAS RIVER	12/11/81	0.3	0.2
CA:CLAY STATION	FOLSOM S. CANAL	10/20/81	0.2	0.2
CA:DIABLO CANYON	PACIFIC OCEAN	10/ 9/81	0.4	0.2
CA:EUREKA	HUMBOLDT BAY	10/ 1/81	0.1	0.2
CA:SAN ONOFRE	PACIFIC OCEAN	10/16/81	0.3	0.2
CO:GREELEY	SOUTH PLATTE RIVER	10/20/81	0.7	0.2
CT:EAST HADDAM	CONNECTICUT RIVER	10/15/81	1.2	0.2
CT:WATERFORD	LONG ISLAND SOUND	10/14/81	0.4	0.2
FL:CRYSTAL RIVER	GULF OF MEXICO	10/ 5/81	0.2	0.2
IA:CEDAR RAPIDS	CEDAR RIVER	10/ 1/81	0.3	0.2
ID:BUHL	SNAKE RIVER	10/30/81	0.3	0.2
IL:BYRON	ROCK RIVER	10/ 1/81	0.3	0.2
IL:E. MOLINE	MISSISSIPPI RIVER	11/15/81	0.4	0.2
IL:MARSEILLES	ILLINOIS RIVER	11/15/81	0.4	0.2
IL:MORRIS	ILLINOIS RIVER	11/15/81	0.3	0.2
IL:OREGON	ROCK RIVER	11/15/81	0.5	0.2
IL:ZION	LAKE MICHIGAN	11/15/81	0.3	0.2
LA:NEW ORLEANS	MISSISSIPPI RIVER	10/ 2/81	0.3	0.2
MA:PLYMOUTH	CAPE CODE BAY	10/ 2/81	0.1	0.2
MA:ROWE	DEERFIELD RIVER	10/29/81	0.3	0.2
MD:CONOWINGO	SUSQUEHANNA RIVER	10/ 6/81	0.4	0.2
MD:LUSBY	CHESAPEAKE BAY	10/ 6/81	0.2	0.2
ME:WISCASSET	MONTSEWAY BAY	10/ 6/81	0.1	0.2
MI:BRIDGMAN	LAKE MICHIGAN	10/10/81	0.7	0.2
MI:CHARLEVOIX	LAKE MICHIGAN	10/ 3/81	0.3	0.2
MI:MONROE	LAKE ERIE	10/ 5/81	0.3	0.2
MI:SOUTH HAVEN	LAKE MICHIGAN	10/12/81	0.5	0.2
MN:MONTICELLO	MISSISSIPPI RIVER	10/ 6/81	0.2	0.2
MN:RED WING	MISSISSIPPI RIVER	10/16/81	0.5	0.2
MS:PORT GIBSON	MISSISSIPPI RIVER	10/29/81	0.3	0.2
NC:CHARLOTTE	CATAWBA RIVER	10/ 7/81	0.2	0.2
NC:SOUTHPORT	ATLANTIC OCEAN	10/ 2/81	0.2	0.2
NE:RULO	MISSOURI RIVER	10/16/81	0.6	0.2
NJ:BAYSIDE	DELAWARE RIVER	10/ 6/81	0.5	0.2
NJ:OYSTER CREEK	OYSTER CREEK	10/ 8/81	0.3	0.2
NV:BOULDER CITY	COLORADO RIVER	10/ 1/81	0.3	0.2
NY:OSSINING	HUDSON RIVER	10/ 8/81	0.3	0.2
NY:OSWEGO	LAKE ONTARIO	10/ 1/81	0.5	0.2
NY:POUGHKEEPSIE	HUDSON RIVER	10/ 7/81	0.2	0.2

TABLE 10 (CONTINUED)

SURFACE WATER
TRITIUM CONCENTRATION

OCTOBER - DECEMBER 1981

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± 2s
OH:TOLEDO	LAKE ERIE	10 1/81	0.4	0.2
OR:BRADWOOD	COLUMBIA RIVER	10/24/81	0.3	0.2
PA:DANVILLE	SUSQUEHANNA RIVER	10/ 7/81	0.5	0.2
SC:ALLENDALE	SAVANNAH RIVER	10/29/81	0.3	0.2
SC:BROAD RIVER	BROAD RIVER	10/ 7/81	0.3	0.2
SC:HARTSVILLE	LAKE ROBINSON	10/12/81	1.8	0.2
TN:DAISY	TENNESSEE RIVER	11/ 9/81	0.3	0.2
TN:KINGSTON	CLINCH RIVER	10/ 1/81	0.3	0.2
TX:EL PASO	RIO GRANDE	10/ 8/81	0.4	0.2
TX:MATAGORDA	COLORADO RIVER	10/ 8/81	0.4	0.2
VA:DOSWELL	NORTH ANNA RIVER	10/ 9/81	3.4	0.3
VA:NEWPORT NEWS	JAMES RIVER	10/ 1/81	0.7	0.2
VT:VERNON	CONNECTICUT RIVER	12/22/81	0.3	0.2
WA:NORTHPORT	COLUMBIA RIVER	10/ 2/81	0.2	0.2
WA:RICHLAND	COLUMBIA RIVER	10/12/81	0.5	0.2
WI:TWO CREEKS	LAKE MICHIGAN	11/ 3/81	0.6	0.2
WI:VICTORY	MISSISSIPPI RIVER	10/20/81	0.3	0.2
WV:WHEELING	OHIO RIVER	10/ 6/81	0.2	0.2

s SIGMA COUNTING ERROR

Drinking Water

The drinking water program provides ambient radiation monitoring relevant to the effects of the nuclear power industry, natural environmental levels, and other pertinent sources. These data serve to assess trends and anomalies in concentrations, and to compare with standards set forth in the EPA "National Interim Primary Drinking Water Regulations." These regulations provide for approval of supplies when the combined radium-226 and radium-228 levels do not exceed 5 pCi/l, when the gross alpha (excluding radon and uranium) levels do not exceed 15 pCi/l, when tritium levels do not exceed 20,000 pCi/l, when the strontium-90 levels do not exceed 8 pCi/l, and when the gross beta levels do not exceed 50 pCi/l.

Grab samples are taken at 78 sites which are either major population centers or selected nuclear facility environs.

The analyses include (a) tritium on a quarterly basis (b) gross alpha, gross beta, and strontium-90 on annual composites (gamma analyses are performed if the gross beta activity is greater than 10 pCi/l; radium-226 analyses are performed if the gross alpha exceeds 2 pCi/l; and radium-228 analyses are performed if the radium-226 activity falls between 3 and 5 pCi/l) (c) specific iodine-131 is performed on one quarterly sample per year for each station (d) an annual composite for plutonium-238, -239, uranium-234, -235, -238, on 22 selected sampling locations corresponding to continuously operating air particulate stations.

Tritium analyses are performed by scintillation counting of the distilled samples, gross beta, and gross alpha by evaporating an aliquot on stainless steel planchets for counting, and radium-226 by the standard emanation technique. Strontium-90 is determined by beta counting a strontium carbonate precipitate isolated by ion exchange.

The results of tritium in drinking water analyses for October December 1981 are shown in Table 11.

All samples were taken as either a single grab sample or composite samples taken over 12 to 14 days.

Radon-222 in Drinking Water

Radon-222 in drinking water has previously been considered a source of radiation exposure primarily from an ingestion standpoint. The Office of Radiation Programs (ORP) of the U.S. Environmental Protection Agency (EPA) is investigating radon in water supplies to evaluate the possibility that a major pathway from inhalation exposure may exist in addition to the ingestion pathway. As an inert gas, radon is not chemically bound to the water and consequently can be released during any operation that aerates or agitates water. Depending upon the initial concentration of radon in water,

significant quantities of radon could be released in a home or to the general environment.

To determine the scope of this potential problem, a national ground water sampling program has been initiated by the Eastern Environmental Radiation Facility (EERF) to obtain data on radon concentrations in water supplies throughout the country. Sampling kits have been assembled by EERF and distributed to various state health departments. The kit is designed so that state personnel can collect samples from potable water supplies and ship them, without loss of radon other than radioactive decay, to EERF for analysis.

The selection of water supplies to be sampled is handled by two separate methods. Method 1 in which each state collects samples from all groundwater supplies serving at least 1000 people and Method 2 in which the choice of sampling locations and the number of supplies to be sampled is left to the discretion of the state programs. Each state is asked to obtain a representative sampling of ground water supplies within its boundaries. The extent of the sampling efforts and how representative the data are for a given state is determined primarily by the amount of time each state devotes to the program.

The concentrations of radon in water are determined at the EERF by liquid scintillation counting. The limit of detection for this technique using a 50-minute count and a 10-ml sample is 0.16 pCi or 16 pci/l.

The sampling kits are being provided to the various states on a rotating schedule. This schedule is designed to cover the U.S. within approximately two years. As data from each state are compiled they will be published in ERD.

Summaries of the data from Indiana, North Carolina, New Mexico, Pennsylvania and Wisconsin are shown in Tables 12 - 16.

TABLE 11

DRINKING WATER
TRITIUM CONCENTRATION

OCTOBER - DECEMBER 1981

LOCATION	DATE COLLECTED	nCi/l	± 2s
AK:FAIRBANKS	10/ 5/81	0.2	0.2
AL:DOTHAN	10/ 1/81	0.2	0.2
AL:MONTGOMERY	10/ 2/81	0.3	0.2
AL:MUSCLE SHOALS	10/ 8/81	0.3	0.2
AL:SCOTTSBORO	10/ 8/81	0.3	0.2
AR:LITTLE ROCK	12/11/81	0.2	0.2
CA:BERKELEY	10/ 1/81	0.3	0.2
CA:LOS ANGELES	10/ 1/81	0.2	0.2
CO:DENVER	10/30/81	0.4	0.2
CO:PLATTEVILLE	10/20/81	0.4	0.2
CT:HARTFORD	10/ 1/81	0.5	0.2
DE:DOVER	10/13/81	0.2	0.2
FL:MIAMI	10/ 2/81	0.2	0.2
FL:TAMPA	10/ 5/81	0.3	0.2
GA:BAXLEY	11/19/81	0.4	0.2
GA:SAVANNAH	10/19/81	3.1	0.3
HI:HONOLULU	10/ 1/81	0.2	0.2
IA:CEDAR RAPIDS	9/29/81	0.4	0.2
ID:BOISE	9/28/81	0.2	0.2
ID:IDAHO FALLS	10/ 1/81	0.3	0.2
IL:MORRIS	10/ 2/81	0.1	0.2
IL:W. CHICAGO	9/28/81	0.2	0.2
KS:TOPEKA	10/ 1/81	0.2	0.2
LA:NEW ORLEANS	10/29/81	0.4	0.2
MA:LAWRENCE	10/ 7/81	0.2	0.2
MA:ROWE	10/29/81	0.2	0.2
MD:BALTIMORE	10/ 1/81	0.2	0.2
MD:CONOWINGO	10/ 6/81	0.4	0.2
ME:AUGUSTA	10/ 1/81	0.3	0.2
MI:DETROIT	10/ 2/81	0.3	0.2
MI:GRAND RAPIDS	11/ 3/81	0.3	0.2
MN:MINNEAPOLIS	10/ 5/81	0.3	0.2
MN:RED WING	10/13/81	0.4	0.2
MO:JEFFERSON CITY	9/23/81	0.2	0.2
MS:JACKSON	9/28/81	0.3	0.2
MS:PORT GIBSON	10/29/81	0.2	0.2
MT:HELENA	10/ 9/81	0.2	0.2
NC:CHARLOTTE	10/ 7/81	0.4	0.2
NC:WILMINGTON	10/ 2/81	0.2	0.2
ND:BISMARCK	9/30/81	0.2	0.2
NE:LINCOLN	9/30/81	0.3	0.2
NH:CONCORD	9/29/81	0.3	0.2
NJ:TRENTON	10/26/81	0.3	0.2
NJ:WARETOWN	10/15/81	0.3	0.2

TABLE 11 (CONTINUED)

DRINKING WATER
TRITIUM CONCENTRATION

OCTOBER - DECEMBER 1981

LOCATION	DATE COLLECTED	nCi/l	± 2s
NM:SANTA FE	10/ 2/81	0.4	0.2
NV:LAS VEGAS	9/29/81	0.4	0.2
NY:ALBANY	10/26/81	0.2	0.2
NY:NEW YORK CITY	10/ 1/81	0.3	0.2
NY:NIAGARA FALLS	10/ 1/81	0.2	0.2
NY:SYRACUSE	11/ 9/81	0.5	0.2
OH:CINCINNATI	10/ 1/81	0.3	0.2
OH:COLUMBUS	12/ 2/81	0.2	0.2
OH:EAST LIVERPOOL	10/28/81	0.5	0.2
OH:PAINESVILLE	10/ 1/81	0.5	0.2
OH:TOLEDO	9/28/81	0.5	0.2
OK:OKLAHOMA CITY	10/ 6/81	0.3	0.2
OR:PORTLAND	10/ 7/81	0.2	0.2
PA:COLUMBIA	10/ 1/81	0.2	0.2
PA:HARRISBURG	10/14/81	0.4	0.2
PA:PITTSBURGH	10/28/81	0.4	0.2
PC:ANCON	9/30/81	0.1	0.2
RI:PROVIDENCE	10/ 1/81	0.2	0.2
SC:BARNWELL	10/ 8/81	0.2	0.2
SC:COLUMBIA	10/ 1/81	0.4	0.2
SC:HARTSVILLE	10/12/81	0.3	0.2
SC:JENKINSVILLE	10/30/81	0.4	0.2
SC:SENECA	10/29/81	0.3	0.2
TN:CHATTANOOGA	11/27/81	0.2	0.2
TN:KNOXVILLE	10/ 5/81	0.2	0.2
TX:AUSTIN	10/ 5/81	0.3	0.2
VA:DOSWELL	10/ 8/81	0.4	0.2
VA:LYNCHBURG	9/29/81	0.4	0.2
VA:VIRGINIA BEACH	10/ 5/81	0.2	0.2
WA:RICHLAND	10/12/81	0.4	0.2
WA:SEATTLE	10/ 1/81	0.4	0.2
WI:GENOA	10/20/81	0.2	0.2
WI:MADISON	10/23/81	0.2	0.2

s SIGMA COUNTING ERROR

TABLE 12

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l)	
			pCi/l	± 2s
IN:ALEXANDER	6/15/81	6000	39.2	62.5
IN:ANDERSON	7/16/81	70000	142.5	95.7
IN:ANGOLA	6/24/81	5300	86.0	101.3
IN:ATTICA	6/ 4/81	3868	412.6	118.4
IN:AUBURN	5/13/81	8500	83.3	65.5
IN:AURORA	6/ 8/81	4300	383.5	76.7
IN:BERNE	5/11/81	3200	17.5	60.6
IN:BICKNELL	5/27/81	3700	53.9	60.4
IN:BLOOMFIELD	6/29/81	3000	297.9	64.0
IN:BOONEVILLE	6/23/81	3200	176.3	62.6
IN:BRAZIL	6/18/81	4000	370.1	99.9
IN:BREMEN	5/12/81	3800	1.5	44.7
IN:BROWNSBURG	7/13/81	5500	15.9	73.7
IN:CARMEL	5/19/81	20000	42.7	70.8
IN:CHANDLER	6/23/81	2800	-17.3	121.6
IN:CHARLESTOWN	8/13/81	7000	397.7	89.5
IN:CHESTERFIELD	4/23/81	2690	80.3	88.7
IN:CHESTERTON	5/26/81	10000	24.5	60.0
IN:CLINTON	7/14/81	5350	267.4	138.3
IN:COLOMBIA CITY	4/29/81	5200	-30.4	60.9
IN:COLUMBUS	11/10/81	32000	72.3	64.5
IN:CONNERSVILLE	8/31/81	17800	86.5	60.2
IN:COVINGTON	4/29/81	2800	318.2	65.2
IN:CROWN POINT	8/16/81	13000	38.5	69.8
IN:DANVILLE	6/15/81	1800	13.5	70.1
IN:DECATUR	5/11/81	8400	15.0	59.1
IN:DELPHI	5/18/81	3000	65.8	83.0
IN:DUNKIRK	4/20/81	3500	271.2	86.0
IN:DYER	8/10/81	9700	33.4	210.9
IN:EDINBURG	7/ 7/81	4906	212.9	128.8
IN:ELKHART	5/27/81	41000	60.6	107.4
IN:ELWOOD	6/15/81	10500	30.0	62.2
IN:FAIRMOUNT	7/ 6/81	3427	84.0	61.2
IN:FORT BRANCH	6/25/81	3200	34.9	88.0
IN:FRANKFORT	4/15/81	15000	-26.2	63.4
IN:FRANKLIN	11/ 9/81	13000	15.9	72.1
IN:GARRETT	5/13/81	4900	-28.6	62.9
IN:GAS CITY	7/ 6/81	8500	49.7	59.2
IN:GREENCASTLE	6/15/81	3000	310.9	77.3
IN:GREENDALE	9/ 1/81	4500	273.1	76.5
IN:GREENFIELD	11/10/81	11398	29.4	61.6
IN:GREENWOOD	11/ 9/81	19500	156.0	75.7
IN:HARTFORD CITY	4/28/81	8500	-7.2	74.4
IN:JEFFERSONVILLE	9/ 1/81	5100	222.1	73.0
IN:JEFFERSONVILLE	8/12/81	38800	160.1	101.8
IN:KENDELLVILLE	5/12/81	8300	1.8	74.1
IN:KNOX	5/ 4/81	3600	104.4	61.1
IN:KOKOMO	7/ 7/81	5000	359.0	125.2
IN:LA PORTE	4/20/81	23000	27.1	75.8
IN:LAFAYETTE	4/28/81	48000	254.3	66.7
IN:LAWRENCEBURG	6/ 9/81	4800	145.6	62.9
IN:LEBANON	4/ 9/81	12000	21.1	90.6

TABLE 12 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l)	
			pCi/l	± 2s
IN:LIGONIER	5/12/81	3000	-59.2	73.4
IN:LINTON	6/18/81	7000	-327.0	100.4
IN:LOWELL	6/29/81	6000	-6.6	60.4
IN:MADISON	6/ 9/81	13500	185.9	62.7
IN:MARION	4/21/81	40000	80.3	65.4
IN:MISHAWAKA	5/27/81	50000	-19.0	104.2
IN:MONTICELLO	5/18/81	5000	18.7	59.5
IN:MOORESVILLE	7/13/81	6000	421.5	82.1
IN:NAPPANNEE	5/12/81	4000	33.4	62.7
IN:NEW CASTLE	8/ 5/81	20032	64.3	60.2
IN:NEW WHITELAND	11/ 9/81	6000	49.3	73.6
IN:NO. MANCHESTER	4/29/81	6000	-7.5	60.2
IN:NOTRE DAME	5/27/81	5500	269.6	111.1
IN:PERU	4/15/81	15000	68.7	64.5
IN:PETERSBURG	6/24/81	3000	0.1	100.5
IN:PLAINVILLE	6/29/81	9000	55.2	58.8
IN:PLYMOUTH	6/ 8/81	9500	123.6	42.6
IN:PORTLAND	4/20/81	7900	61.8	83.7
IN:PRINCETON	6/23/81	4035	63.0	119.2
IN:RENSSELAER	5/18/81	5000	-9.6	60.1
IN:RISING SUN	5/11/81	2500	185.0	148.9
IN:ROCHESTER	6/ 8/81	4631	35.8	42.1
IN:ROCKVILLE	7/14/81	3000	66.1	63.6
IN:RUSHVILLE	9/ 2/81	6600	2.2	60.4
IN:SELLERSBURG	7/ 9/81	3177	187.8	89.1
IN:SHELBYVILLE	9/16/81	15500	287.2	105.5
IN:SOUTH BEND	5/27/81	125000	71.4	108.4
IN:SPENCER	6/15/81	1050	81.2	61.4
IN:SULLIVAN	5/27/81	5000	98.6	60.7
IN:TELL CITY	6/23/81	2400	306.6	79.6
IN:TERRE HAUTE	5/27/81	2800	248.8	62.2
IN:TIPTON	4/14/81	5500	30.5	73.6
IN:UNION CITY	7/ 8/81	4000	31.4	107.9
IN:UPLAND	8/11/81	3500	53.8	59.5
IN:VALPARASIO	5/26/81	16000	96.5	63.2
IN:VINCENNES	5/27/81	20000	174.4	63.7
IN:W. LAFAYETTE	4/28/81	21000	238.0	65.4
IN:W. LAFAYETTE	7/ 7/81	40000	133.4	128.6
IN:WABASH	4/27/81	15000	80.9	60.8
IN:WALKERTON	6/15/81	2040	34.2	61.5
IN:WASHINGTON	6/24/81	4700	204.7	106.6
IN:WINCHESTER	9/ 8/81	5250	7.2	59.5

s SIGMA ERROR (IN PERCENT)

TABLE 13

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l)	
			pCi/l	± 2s
NC:ABERDEEN	11/10/81	2800	444.6	142.3
NC:ATLANTIC BEACH	10/30/81	185	127.8	98.5
NC:ATLANTIC BEACH	10/30/81	1300	15.7	74.5
NC:AURORA	1/19/82	700	73.3	119.1
NC:AVLANDER	11/10/81	1200	106.5	66.6
NC:AYDEN	11/ 6/81	4500	94.8	129.2
NC:BEAUFORT	10/30/81	4500	-16.2	75.8
NC:BELHAVEN	11/21/81	2400	71.5	133.5
NC:BENSON	10/28/81	2779	131.5	106.3
NC:BETHEL	11/ 6/81	1950	47.3	137.2
NC:BEULAVILLE	11/13/81	1375	50.2	123.8
NC:BLADENBORO	11/19/81	1500	66.6	93.4
NC:BOONEVILLE	11/ 3/81	1200	2021.0	101.1
NC:BUNN	2/10/82	640	10510.0	105.1
NC:BURGAW	10/16/81	2800	50.7	72.8
NC:BUXTON	11/23/81	1630	-25.4	87.3
NC:CAROLINA BEACH	11/18/81	2500	-1.1	106.1
NC:CARTHAGE	11/10/81	690	34.7	134.7
NC:CARY	1/18/82	660	4085.5	122.6
NC:CASWELL BEACH	11/ 4/81	2000	10.8	28.7
NC:CHADBOURN	11/19/81	2500	1.1	91.3
NC:CHINA GROVE	12/15/81	4200	528.2	78.9
NC:CLAREMONT	10/27/81	900	-2.8	58.7
NC:CLARKTON	11/19/81	1000	-16.0	64.3
NC:CLAYTON	10/29/81	5000	507.1	93.7
NC:CLINTON	11/19/81	10300	58.0	89.5
NC:COLERAIN	11/17/81	284	132.6	76.1
NC:COLUMBIA	11/24/81	850	8.8	73.6
NC:CONWAY	11/25/81	1000	375.6	105.5
NC:CULLOWHEE	10/28/81	8000	34.5	106.8
NC:DEEP RUN	11/13/81	7600	-42.8	121.7
NC:EAST BEND	11/ 3/81	325	312.1	77.9
NC:EDENTON	12/ 3/81	5000	61.5	86.0
NC:ELIZABETH CITY	12/ 4/81	12000	26.9	74.9
NC:ELIZABETHTOWN	11/19/81	3300	-44.1	91.0
NC:ELM CITY	10/29/81	1600	125.2	86.8
NC:FAIR BLUFF	11/20/81	385	-27.2	79.8
NC:FAIRMOUNT	11/20/81	2600	-51.2	78.7
NC:FARMVILLE	11/ 6/81	6500	203.8	130.6
NC:FAYETTEVILLE	11/17/81	1300	195.3	82.2
NC:FAYETTEVILLE	11/17/81	1600	470.4	87.0
NC:FAYETTEVILLE	11/17/81	2611	371.1	87.1
NC:FAYETTEVILLE	11/17/81	3800	846.2	93.2
NC:FAYETTEVILLE	11/17/81	500	275.6	81.1
NC:FAYETTEVILLE	11/17/81	1370	207.1	81.7
NC:FAYETTEVILLE	11/17/81	1511	298.6	85.7
NC:FAYETTEVILLE	11/17/81	1460	659.5	88.9
NC:FAYETTEVILLE	11/17/81	6500	508.5	85.2

TABLE 13 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l)	
			pCi/l	± 2s
NC:FAYETTEVILLE	10/14/81	1052	508.4	114.3
NC:FOUR OAKS	2/10/82	1320	163.6	61.3
NC:FREMONT	10/29/81	1800	45.5	84.7
NC:GARYSBURG	11/ 5/81	425	156.9	89.5
NC:GASTON	11/ 5/81	1000	1540.5	107.8
NC:GOLDSBORO	11/13/81	3250	-152.7	118.9
NC:GOLDSBORO	11/13/81	3500	11.8	123.1
NC:GRANDVIEW	11/ 3/81	500	533.3	79.7
NC:GRANDY	11/23/81	325	140.8	93.0
NC:GRIFTON	11/ 6/81	1180	35.0	128.9
NC:HARKERS ISLAND	10/30/81	2000	-6.1	76.1
NC:HARMONY	11/ 3/81	4000	1241.5	86.9
NC:HAVELOCK	10/29/81	5000	87.1	87.8
NC:HERTFORD	12/ 3/81	2100	140.8	90.5
NC:HERTFORD	12/ 3/81	1000	100.7	88.6
NC:HIGH SHOALS	12/17/81	1000	21.3	84.2
NC:HOBGOOD	11/10/81	750	173.9	136.5
NC:JACKSON	11/25/81	800	516.2	108.2
NC:JACKSONVILLE	11/13/81	1100	88.6	125.3
NC:JACKSONVILLE	11/13/81	1594	128.4	125.5
NC:JACKSONVILLE	11/13/81	1160	527.0	131.5
NC:KINANSVILLE	11/13/81	1027	26.6	123.3
NC:KINTON	10/31/81	310	128.9	83.6
NC:KINTON	10/31/81	27880	34.4	81.9
NC:KURE BEACH	11/18/81	3000	5.0	107.3
NC:LA GRANGE	11/13/81	3300	4.3	123.2
NC:LA GRANGE	11/13/81	1970	-51.7	121.1
NC:LAKE LURE	10/27/81	240	10640.0	106.4
NC:LAKE WACCAMAW	11/19/81	1350	11.7	91.9
NC:LAUREL HILLS	11/14/81	1000	343.4	72.7
NC:LIBERTY	11/17/81	2000	729.3	84.9
NC:LINVILLE	10/23/81	2500	1887.0	113.2
NC:LITTLETON	11/ 5/81	950	1401.0	104.6
NC:LONG BEACH	10/ 6/81	1200	88.2	73.8
NC:LUCAMA	2/10/82	1073	493.4	68.6
NC:LUMBERTON	11/20/81	20420	43.5	82.2
NC:MACCLESFIELD	11/ 6/81	650	244.6	141.0
NC:MANTEO	11/24/81	917	80.7	79.4
NC:MAXTON	11/14/81	2700	42.8	66.3
NC:MAYSVILLE	10/31/81	930	131.5	102.9
NC:MCADENVILLE	12/16/81	920	72.2	61.3
NC:MICRO	2/10/82	820	1140.0	73.7
NC:MIDDLESEX	10/29/81	850	1570.0	109.9
NC:MONCURE	11/11/81	600	131.4	59.2
NC:MOREHEAD CITY	10/30/81	5000	117.2	77.9
NC:MORGANTON	10/23/81	565	1278.5	95.6
NC:MORGANTON	10/23/81	1352	2168.5	108.6
NC:MT. OLIVE	2/ 6/82	6000	114.6	88.8

TABLE 13 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l)	
			pCi/l	± 2s
NC:MT. OLIVE	2/ 6/82	6000	120.3	88.8
NC:MURFREESBORO	11/25/81	3000	316.6	106.1
NC:NAGS HEAD	11/23/81	200	-80.5	85.9
NC:NEW BERN	10/31/81	20000	65.1	82.5
NC:NEWPORT	10/29/81	1900	181.3	89.6
NC:OCEAN ISLE	10/ 6/81	2150	59.7	73.2
NC:ORIENTAL	10/29/81	900	-13.9	85.9
NC:PEMBROKE	11/20/81	6000	-36.9	80.3
NC:PIKEVILLE	10/29/81	700	2821.0	112.9
NC:PINE LEVEL	10/29/81	953	165.6	86.6
NC:PINEBLUFF	11/10/81	966	180.2	137.0
NC:PINEHURST	11/10/81	4500	336.5	139.5
NC:PINETOPS	11/ 8/81	715	103.2	97.6
NC:PINK HILL	11/13/81	300	65.3	124.6
NC:PLYMOUTH	12/ 3/81	1487	55.0	88.6
NC:PRINCETON	10/29/81	1200	1162.0	104.6
NC:RAEFORD	11/14/81	3600	239.1	70.5
NC:RED SPRINGS	11/14/81	4000	37.6	64.3
NC:RICH SQUARE	11/10/81	1400	222.5	67.9
NC:RICHLANDS	11/13/81	2500	124.3	125.9
NC:ROBERSONVILLE	11/10/81	2200	137.4	67.9
NC:ROCKWELL	12/15/81	1342	1139.0	85.2
NC:ROLESVILLE	2/10/82	1425	7454.0	149.1
NC:ROSE HILL	10/16/81	1600	99.2	97.5
NC:ROSEBORO	11/19/81	1600	0.0	88.3
NC:ROWLAND	11/20/81	1200	-13.2	80.6
NC:RURAL HILL	11/ 3/81	1700	290.2	75.4
NC:SALTER PATH	10/31/81	1800	280.5	87.5
NC:SANBURY	10/15/81	2000	196.9	85.6
NC:SCOTLAND NECK	11/10/81	3000	157.1	67.6
NC:SELMA	2/10/82	4900	1045.5	73.2
NC:SEVERN	11/25/81	350	336.0	105.8
NC:SHALLOTTE	10/ 6/81	700	108.1	73.5
NC:SIMS	2/10/82	192	1254.0	81.1
NC:SNOW HILL	11/ 6/81	2460	112.1	129.2
NC:SOUTH MILLS	12/ 4/81	3100	26.7	77.7
NC:SOUTHPORT	11/ 4/81	3700	662.8	112.2
NC:SPARTA	10/22/81	1700	1471.5	117.7
NC:SPENCER MT.	12/16/81	240	34.2	60.9
NC:SPRING HOPE	10/29/81	1800	1444.0	108.2
NC:SPRING LAKE	11/17/81	320	73.6	78.4
NC:SPRING LAKE	11/17/81	8000	91.5	77.8
NC:STANTONBURG	12/ 3/81	1200	93.5	90.7
NC:STONEVILLE	10/22/81	2400	1236.5	111.3
NC:SURF CITY	11/19/81	5000	-8.4	90.4
NC:SWAN QUARTER	11/21/81	3000	7.7	130.1
NC:SWANSBORO	10/31/81	980	115.9	103.5
NC:TABOR CITY	11/20/81	3000	4.5	80.0

TABLE 13 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l)	
			pCi/l	± 2s
NC:TARBORO	11/ 6/81	610	461.7	147.1
NC:TROUTMAN	10/27/81	650	3083.0	92.6
NC:WALKERTOWN	11/ 3/81	150	2236.5	111.9
NC:WALLACE	10/23/81	3000	44.1	77.9
NC:WARSAW	10/22/81	3000	70.6	93.4
NC:WEST JEFFERSON	10/22/81	1000	645.2	103.3
NC:WHITAKERS	11/ 5/81	950	2149.5	117.7
NC:WHITE LAKE	11/19/81	1500	-36.3	87.7
NC:WHITEVILLE	11/19/81	5780	-33.1	90.8
NC:WILLIAMSTON	11/10/81	6500	179.6	67.3
NC:WILMINGTON	11/ 4/81	3625	58.8	102.2
NC:WILMINGTON BEAC	11/18/81	400	71.4	106.4
NC:WINDSOR	11/10/81	2500	178.6	67.7
NC:WINTERVILLE	11/ 6/81	3500	114.3	129.8
NC:WINTON	11/18/81	850	164.4	67.0
NC:WRIGHTSVILLE BE	11/ 4/81	670	39.7	100.9
NC:WRIGHTSVILLE BE	11/18/81	100	37.0	102.7
NC:WRIGHTSVILLE	11/18/81	5000	-37.9	103.2
NC:WRIGHTSVILLE BE	11/18/81	3000	-9.7	102.9
NC:YAUPON BEACH	10/ 6/81	1800	44.4	72.4
NC:YOUNGSVILLE	10/14/81	600	2637.5	131.9

ND NO DATA FOR THIS PERIOD

s SIGMA ERROR (IN PERCENT)

TABLE 14

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l)	
			pCi/l	± 2s
NM:ALAMOGORDO	9/24/81	1000	323.0	93.8
NM:ALBUQUERQUE	7/28/81	300000	125.3	130.0
NM:ALBUQUERQUE	7/28/81	1700	265.8	84.6
NM:ALBUQUERQUE	7/28/81	1000	1329.0	272.3
NM:ANTHONY	11/ 5/81	3200	16.6	91.9
NM:ARTESIA	11/17/81	1100	24.7	72.9
NM:ARTESIA	11/17/81	13700	36.9	72.8
NM:BAYARD	2/ 4/82	3500	282.8	102.5
NM:BELEN	9/ 2/81	10000	338.6	149.0
NM:BELEN	9/ 2/81	2100	29.6	143.9
NM:BERNALILLO	7/28/81	3300	140.2	128.0
NM:CANNON AFB	8/20/81	8000	164.8	89.4
NM:CARLSBAD	11/17/81	30000	66.6	73.0
NM:CARLSBAD	11/19/81	2693	18.0	118.8
NM:CARLSBAD CAVERN	11/18/81	1861	-157.3	118.8
NM:CENTRAL	2/ 4/82	2800	194.6	88.7
NM:CHAMA	10/14/81	1700	83.3	104.0
NM:CHAPARRAL	11/ 5/81	2433	92.2	93.8
NM:CLAYTON	11/13/81	3000	295.4	78.0
NM:CLOUDCROFT	9/24/81	1000	85.4	92.2
NM:CLOVIS	8/20/81	37000	66.9	87.5
NM:CUBA	10/13/81	2000	325.6	71.4
NM:DEMING	2/ 3/82	10038	282.8	103.2
NM:DEXTER	11/17/81	1100	239.4	77.8
NM:DIXON	1/21/82	400	628.3	106.8
NM:DONA ANA	11/ 4/81	3725	732.5	116.7
NM:ESPANOLA	1/21/82	8000	323.0	86.2
NM:EUNICE	11/19/81	3800	-57.7	98.3
NM:FT. SUMNER	8/20/81	1700	881.7	101.4
NM:GALLUP	10/22/81	19000	401.6	85.9
NM:GRANTS	10/23/81	11365	477.4	76.1
NM:HAGERMAN	11/17/81	1050	409.5	79.8
NM:HATCH	11/ 3/81	2000	120.1	128.9
NM:HOBBS	11/19/81	30000	45.8	102.9
NM:HURLEY	2/ 4/82	1591	43.5	85.7
NM:JAL	11/19/81	2662	9.0	98.7
NM:KIRKLAND AFB	7/28/81	16114	201.3	129.6
NM:LA ALAMOS	1/21/82	25000	49.6	83.4
NM:LA LUZ	9/24/81	1400	37.2	91.1
NM:LAS CRUCES	11/ 5/81	50000	390.1	101.2
NM:LORDSBURG	2/ 4/82	3900	445.6	93.0
NM:LOS LUNAS	9/ 2/81	2800	160.4	146.4
NM:LOVING	11/18/81	1600	190.4	122.6
NM:LOVINGTON	11/19/81	10500	-36.7	99.5
NM:MAGDALENA	2/ 5/82	1300	-9.0	83.7
NM:MILAN	10/23/81	3500	304.9	74.6
NM:MORA	11/11/81	1000	1166.0	122.3
NM:MORIARITY	9/ 2/81	1500	306.4	146.1

TABLE 14 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l)	
			pCi/l	± 2s
NM:MOUNTAINAIR	9/ 2/81	1075	-32.6	140.4
NM:NM STATE UNIV.	11/ 4/81	15000	-81.7	103.3
NM:PECOS	11/12/81	1000	59.5	86.8
NM:PORTALES	8/20/81	12000	263.8	96.3
NM:RIO RANCHO	7/28/81	12000	404.1	131.0
NM:ROSWELL	11/16/81	4000	52.1	74.0
NM:ROSWELL	11/16/81	39000	230.6	76.4
NM:RUIDOSO DOWNS	9/25/81	3000	-89.2	72.5
NM:SAN RAFAEL	10/23/81	1200	295.7	73.9
NM:SANTA CRUZ	1/21/82	600	391.8	88.1
NM:SANTA ROSA	8/19/81	2485	-97.6	141.4
NM:SILVER CITY	2/ 4/82	13700	74.9	86.1
NM:SOCORRO	2/ 3/82	7004	42.1	101.6
NM:STATE PENITENTI	11/ 2/81	1128	544.0	65.3
NM:SUNLAND PARK	11/ 5/81	3250	-18.3	91.0
NM:TAOS	1/22/82	3000	575.0	92.0
NM:TEXICO	8/20/81	1000	494.5	96.7
NM:TRUTH OR CONSEQ	2/ 3/82	7000	366.4	104.1
NM:TUCUMCARI	8/19/81	7800	501.3	111.5
NM:VAUGHN	8/20/81	1600	1205.5	96.5
NM:WHITE SANDS MR	11/ 4/81	4570	443.3	117.0

s SIGMA ERROR (IN PERCENT)

TABLE 15

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l)	
			pCi/l	± 2s
PA:ALIQUIPPA	12/23/81	22000	333.8	113.2
PA:ALIQUIPPA	12/30/81	12000	350.5	115.7
PA:AMBLER	10/16/81	24500	1027.0	82.1
PA:ASPINWALL	12/ 2/81	3288	581.8	75.6
PA:AVONMORE	11/12/81	1300	40.8	90.2
PA:BARNESBORO	12/ 2/81	2708	-29.2	113.1
PA:BEAVER	12/30/81	5400	377.0	113.1
PA:BELLEFONTE	10/22/81	10000	237.6	90.3
PA:BERKS CITY	11/23/81	3040	163.2	63.6
PA:CAMPBELLTOWN	11/10/81	4300	175.1	63.3
PA:CHALFONT	10/14/81	3575	2125.0	127.5
PA:CHESWICK	12/ 3/81	3700	267.0	102.8
PA:CLYMER	12/ 8/81	2500	47.3	70.5
PA:CORAOPOLIS	11/24/81	20000	166.1	79.6
PA:CORAOPOLIS	12/29/81	10000	432.1	66.9
PA:CORRY	10/27/81	2954	533.2	71.9
PA:COUDERSPORT	11/13/81	3000	276.6	80.9
PA:DALLAS	11/19/81	3000	1579.0	123.9
PA:DOVER	11/18/81	7329	1485.5	81.8
PA:DOYLESTOWN	10/16/81	9300	2001.0	100.0
PA:DUQUESNE	10/23/81	10000	141.2	72.4
PA:EDGEWORTH	10/27/81	8500	212.4	64.8
PA:EDINBORO	10/27/81	12000	624.4	71.8
PA:ELYSBURG	11/19/81	5000	68.4	99.9
PA:EMMAUS	12/17/81	15000	177.3	89.4
PA:ETNA	12/28/81	6000	263.6	62.8
PA:FAYETTEVILLE	11/17/81	3500	778.8	92.5
PA:FLEETWOOD	11/16/81	3100	299.2	76.2
PA:FORD CITY	12/ 2/81	4600	71.5	69.0
PA:FORD CITY	12/ 2/81	5100	522.1	78.3
PA:FRACKVILLE	12/11/81	6000	1958.5	117.5
PA:GALLITZIN	12/ 2/81	2496	-5.6	113.9
PA:GLENSHAW	1/ 5/82	40000	245.5	62.4
PA:GREENCASTLE	12/ 9/81	4200	446.7	69.2
PA:GROVE CITY	10/30/81	11600	164.3	101.8
PA:HATBORO	10/20/81	17000	780.5	31.2
PA:HATFIELD	10/20/81	5540	1298.0	38.9
PA:HAWLEY	10/14/81	< 100	1945.5	77.8
PA:HAZELTON	12/11/81	10000	1581.5	110.7
PA:HELLERTOWN	12/16/81	7000	716.6	114.3
PA:HORSHAM	10/20/81	7812	777.7	31.1
PA:INDIANA	12/ 8/81	1200	10.4	71.0
PA:KUTZTOWN	11/10/81	9100	267.0	64.1
PA:LANDISVILLE	10/26/81	3156	379.6	64.5
PA:LANSDALE	10/21/81	40000	3269.5	163.5
PA:LANSDALE	10/24/81	40000	857.2	72.5
PA:LEMONT	10/22/81	5500	357.4	92.8
PA:LEOLA	10/26/81	4000	303.3	64.4

TABLE 15 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l)	
			pCi/l	± 2s
PA:LIONVILLE	11/19/81	12000	173.9	101.8
PA:LITITZ	10/26/81	7200	140.4	62.3
PA:MALVERN	10/29/81	3100	1943.5	136.1
PA:MALVERN	11/12/81	10816	1163.5	104.7
PA:MALVERN	11/12/81	10816	417.7	96.7
PA:MARS	12/ 1/81	8200	123.9	62.5
PA:MEADVILLE	12/ 8/81	19000	265.1	75.8
PA:MEYERSTOWN	11/ 9/81	5000	235.8	77.1
PA:MILLERSBURG	11/12/81	4500	2052.5	123.3
PA:MONACA	12/30/81	7633	311.0	112.7
PA:MONTOURSVILLE	11/ 2/81	5500	672.2	79.9
PA:MT. PENN	11/23/81	11700	476.1	68.9
PA:NEWTOWN	10/16/81	3650	920.4	82.8
PA:OIL CITY	11/ 4/81	24850	469.0	67.9
PA:PALMERTON	12/10/81	6000	878.6	118.5
PA:PENN STATE UNIV	10/22/81	35000	332.0	91.3
PA:PENNSBURG	10/20/81	3200	144.2	28.8
PA:PERKASIE	10/14/81	5000	1599.0	127.9
PA:QUAKERTOWN	10/14/81	7000	2075.0	124.5
PA:READING	11/23/81	18500	138.3	62.2
PA:SAXONBURG	12/ 8/81	1500	69.5	70.6
PA:SEWICKLEY	10/27/81	8000	118.2	62.9
PA:SHARPSBURG	12/15/81	5500	357.2	73.2
PA:SINKING SPRINGS	11/10/81	20000	384.5	69.0
PA:SLATINGTON	12/17/81	4600	197.2	88.8
PA:SLIPPERY ROCK	12/ 1/81	4900	51.2	60.6
PA:SOUTH HEIGHTS	12/23/81	12000	583.8	116.8
PA:SOUTHHAMPTON	10/15/81	10500	80.3	82.8
PA:SPRINGDALE	12/15/81	5500	207.8	71.8
PA:SUMMIT HILL	12/10/81	4500	1358.0	122.3
PA:TELFORD	10/14/81	3500	1352.0	121.7
PA:TITUSVILLE	10/27/81	8000	651.7	71.2
PA:TRAPPE	10/28/81	7500	1343.0	80.6
PA:W. BRADFORD	11/23/81	12600	2916.0	87.5
PA:WARMINSTER	10/15/81	4000	1179.0	106.1
PA:WARMINSTER	10/15/81	36000	2565.0	128.3
PA:WARREN	11/12/81	20000	466.8	99.7
PA:WARRINGTON	10/15/81	7000	4180.0	125.4
PA:WEATHERLY	12/10/81	3000	1140.5	119.5
PA:WEST VIEW	10/27/81	200000	153.7	61.8
PA:YORK	11/18/81	5500	2752.5	82.6

s SIGMA ERROR (IN PERCENT)

TABLE 16

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE		POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l)	
				pCi/l	± 2s
WI:ALGOMA	12/ 2/81		4023	111.5	61.6
WI:AMERY	12/10/81		2414	1205.0	114.6
WI:ANTIGO	4/ 6/81		9164	208.2	52.0
WI:ARMSTRONG CREEK	11/10/80	<	100	349.9	57.2
WI:BARABOO	4/ 9/81		7931	269.5	120.9
WI:BARRON	12/11/81		2337	454.8	88.7
WI:BEAVER DAM	4/20/81		14265	107.4	88.3
WI:BELOIT	4/ 9/81		35256	127.4	118.8
WI:BERLIN	4/10/81		5338	418.1	113.1
WI:BLACK RIVER FAL	4/ 7/81		3273	27.8	151.7
WI:BLOOMER	12/11/81		3378	225.1	84.6
WI:BONDUEL	4/20/81		1109	223.7	79.4
WI:BRODHEAD	4/ 9/81		2515	109.3	117.4
WI:BURLINGTON	4/21/81		9000	46.9	77.8
WI:CASSVILLE	4/ 8/81		1343	126.8	38.7
WI:CEDARBURG	4/21/81		10163	309.2	69.2
WI:CHETEK	12/11/81		1630	572.5	88.6
WI:CHILTON	4/22/81		3030	65.5	102.2
WI:CHIPPEWA FALLS	12/11/81		12351	305.1	85.3
WI:CLINTONVILLE	4/20/81		4660	597.5	86.6
WI:COLFAX	12/11/81		1026	600.0	89.6
WI:COLUMBUS	4/10/81		3789	145.9	106.1
WI:CORNELL	12/11/81		1616	451.2	87.5
WI:CRANDON	4/ 6/81		1582	139.9	51.8
WI:CRIVITZ	12/ 2/81		1100	117.3	44.4
WI:CUBA CITY	4/ 8/81		1993	9.3	39.5
WI:CUMBERLAND	12/11/81		1839	319.6	87.1
WI:DARLINGTON	4/ 8/81		2351	29.0	40.6
WI:DELAVAN	4/21/81		5526	97.2	79.9
WI:DEPERE	12/ 2/81		14805	151.6	61.6
WI.DICKEYVILLE	4/ 8/81		1057	96.1	39.4
WI:DODGEVILLE	4/ 8/81		3255	19.9	77.2
WI:EAGLE RIVER	12/10/81		1326	126.6	105.9
WI:EAU CLAIRE	12/11/81		43662	392.2	86.1
WI:EDGERTON	4/10/81		4118	134.0	107.5
WI:ELKHORN	4/21/81		4300	11.3	55.0
WI:EVANSVILLE	4/ 9/81		2992	126.5	118.0
WI:FENNIMORE	4/ 8/81		1861	47.4	44.5
WI:FLORENCE	12/ 2/81		1262	652.0	68.3
WI:FLORENCE	11/ 5/81	<	100	8746.0	175.0
WI:FLORENCE	11/ 5/81	<	100	677.9	98.2
WI:FOND DU LAC	4/22/81		35515	221.6	105.4
WI:FORT ATKINSON	4/21/81		9164	198.3	66.4
WI:FRANKLIN	4/21/81		1200	217.1	80.9
WI:FREDERIC	12/10/81		1075	272.8	91.3
WI:GENOA CITY	4/21/81		1900	40.3	77.7
WI:GRAFTON	4/21/81		8434	123.1	64.8
WI:HARTFORD	4/20/81		6499	213.5	88.9
WI:HARTLAND	4/20/81		2763	62.6	86.4

TABLE 16 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l)	
			pCi/l	± 2s
WI:HAYWARD	12/10/81	1653	241.7	90.2
WI:HORICON	4/20/81	3356	249.3	89.5
WI:HORTONVILLE	4/20/81	1524	193.8	79.7
WI:HUDSON	12/10/81	5049	1107.5	105.0
WI:IOLA	4/10/81	1015	93.4	105.7
WI:JANESVILLE	4/ 9/81	46426	250.6	122.6
WI:JEFFERSON	4/21/81	5429	295.5	68.0
WI:KAUKAUNA	4/22/81	11343	412.5	107.3
WI:KEWAUNEE	12/ 2/81	2901	36.0	60.3
WI:KIEL	12/ 2/81	3110	150.8	62.3
WI:KIMBERLY	4/22/81	6750	243.8	104.9
WI:LA CROSSE	4/ 9/81	51153	183.4	115.4
WI:LAKE GENEVA	4/21/81	5000	64.2	78.6
WI:LAKE MILLS	4/21/81	3556	167.9	66.3
WI:LANCASTER	4/ 8/81	3756	48.1	38.3
WI:LITTLE CHUTE	4/22/81	5365	241.6	106.0
WI:MADISON	4/ 9/81	171770	-55.1	113.6
WI:MANAWA	4/10/81	1105	663.7	116.1
WI:MARATHON	4/ 6/81	1214	846.0	59.2
WI:MARION	4/10/81	1207	1109.5	127.3
WI:MARSHFIELD	4/ 7/81	15560	1091.5	168.9
WI:MAUSTON	4/ 9/81	3476	204.7	120.6
WI:MAYVILLE	4/20/81	4139	119.8	88.0
WI:MEDFORD	12/11/81	3956	396.1	86.6
WI:MELLEN	12/10/81	1168	417.7	92.7
WI:MENOMINEE	12/11/81	11275	314.6	86.9
WI:MENOMONEE FALLS	4/21/81	17098	90.0	64.5
WI:MERRILL	12/11/81	9502	627.1	93.6
WI:MIDDLETON	4/ 9/81	12350	29.9	116.7
WI:MILTON	4/10/81	3699	326.9	112.2
WI:MINERAL POINT	4/ 8/81	2305	-3.2	130.9
WI:MINOCQUA	12/10/81	2381	239.6	92.3
WI:MONONA	4/ 9/81	10420	52.3	116.1
WI:MONROE	4/ 9/81	8654	28.6	117.1
WI:MUKWONAGO	4/20/81	2363	276.4	90.2
WI:MUSCODA	4/ 8/81	1099	105.1	130.1
WI:NEW BERLIN	4/21/81	2740	130.7	115.0
WI:NEW HOLSTEIN	4/22/81	3012	111.3	102.5
WI:NEW LONDON	4/20/81	6120	123.0	77.8
WI:NEW RICHMOND	12/10/81	3707	542.3	94.8
WI:NIAGARA	12/ 2/81	2347	193.8	64.3
WI:OCANTO FALLS	4/20/81	2517	317.6	81.4
WI:OCONOMOWOC	4/21/81	10600	147.7	79.5
WI:OCONTO	12/ 2/81	4667	322.3	66.3
WI:OMRO	4/20/81	2540	772.7	88.7
WI:ONALASKA	4/ 9/81	8000	120.9	113.7
WI:OSCEOLA	12/10/81	1152	854.2	98.1
WI:OSSEO	12/11/81	1356	58.9	81.7

TABLE 16 (CONTINUED)

RADON IN GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l)	
			pCi/l	± 2s
WI:PARK FALLS	12/10/81	2970	302.2	93.7
WI:PESHTIGO	12/ 2/81	3000	273.8	64.3
WI:PEWAUKEE	4/21/81	4671	145.4	79.3
WI:PHILLIPS	12/10/81	1600	671.8	113.7
WI:PLATTEVILLE	4/ 8/81	9599	67.6	39.7
WI:PLYMOUTH	4/22/81	6177	73.9	102.1
WI:PORTAGE	4/ 9/81	7821	99.5	118.3
WI:PRAIRIE DU CHIE	4/ 8/81	5540	97.2	37.9
WI:RANDOM LAKE	4/21/81	1068	78.5	122.4
WI:REEDSBURG	4/ 9/81	4585	86.5	129.7
WI:RHINELANDER	12/11/81	8684	446.3	89.0
WI:RICE LAKE	12/11/81	7278	487.9	87.5
WI:RICHLAND CENTER	4/ 8/81	5086	30.5	109.0
WI:RIPON	4/20/81	7053	656.0	98.4
WI:RIVER FALLS	12/10/81	7238	512.8	97.2
WI:SEYMOUR	12/ 2/81	2194	200.9	62.8
WI:SHAWANO	4/20/81	4950	245.3	79.5
WI:SHELL LAKE	12/10/81	1096	305.6	91.7
WI:SHULLSBURG	4/ 8/81	1376	85.4	43.3
WI:SPARTA	4/ 8/81	6258	581.9	151.0
WI:SPOONER	12/10/81	2540	329.0	92.1
WI:STANLEY	12/11/81	2049	1082.5	102.5
WI:STEVENS POINT	4/ 7/81	23479	694.1	159.7
WI:STOUGHTON	4/ 9/81	6096	115.2	117.8
WI:STRATFORD	4/ 6/81	1125	1904.5	208.1
WI:STURGEON BAY	12/ 2/81	1500	161.4	62.8
WI:SUNPRAIRIE	4/10/81	9935	152.4	105.5
WI:SUSSEX	4/21/81	4300	64.6	64.2
WI:THORP	12/11/81	1469	7499.5	150.0
WI:TOMAH	4/ 8/81	7039	833.7	142.7
WI:TOMAHAWK	12/11/81	3419	624.0	93.6
WI:UNION GROVE	4/21/81	3000	89.2	78.4
WI:VIROQUA	4/ 8/81	3739	181.1	138.4
WI:WALWORTH	4/21/81	1637	200.4	80.4
WI:WASHBURN	12/10/81	2042	494.0	96.2
WI:WATERTOWN	4/21/81	15501	232.4	67.3
WI:WAUKESHA	4/21/81	40274	323.4	118.0
WI:WAUPACA	4/10/81	4342	353.3	106.6
WI:WAUPUN	4/20/81	7946	412.0	92.7
WI:WAUSAU	4/ 6/81	32806	58.2	50.7
WI:WEST BEND	4/22/81	22000	175.1	104.4
WI:WEST SALEM	4/ 9/81	3100	323.1	117.7
WI:WHITE WATER	4/21/81	10844	166.8	64.6
WI:WHITEHALL	12/11/81	1486	67.0	81.2
WI:WILLIAMS BAY	4/21/81	1554	-11.4	77.3
WI:WISCONSIN RAPID	4/ 7/81	18587	128.5	150.4

s SIGMA ERROR (IN PERCENT)

SECTION III. External Gamma Ambient Monitoring Program

The external gamma monitoring program, which began in October 1978, provides a continuous measurement of ambient gamma exposure rates, including cosmic, at selected sites throughout the continental United States. Data from this program will be used to evaluate fluctuations in natural background due to variations in environmental conditions and to provide a means of monitoring any significant increases in ambient gamma levels due to weapons fallout, reactor operations, etc. Initially, the program will consist of approximately 22 sites representing a wide geographic coverage throughout the country. Hopefully, at some later date additional sites will be added to the program. Although exposure measurements at these few sites are not totally representative of nationwide exposures, they will be indicative of national trends.

The monitoring program utilizes CaF_2:Mn thermoluminescent dosimeters (TLD's). These dosimeters are commercially available glass-bulb type dosimeters with energy compensating shields. A group of four TLD's is located at each station or site. Dosimeters are annealed by the station operator prior to positioning in the field. The dosimeters are returned to EERF for readout on an approximate one-month cycle. Several dosimeters are annealed by the station operator as controls and returned with the exposed field dosimeters to correct for any exposures accumulated during shipment.

Results from the period October 1981 through December 1981 are shown in Table 17.

TABLE 17

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE		EXPOSURE RATE	
		MR ± 2s		MICRO R/HR ± 2s	
AL:MONTGOMERY	100181-110281	8.52	8.1	11.09	8.1
AL:MONTGOMERY	110281-120281	8.04	3.8	11.17	3.8
AL:MONTGOMERY	120281- 10482	9.01	3.4	11.37	3.4
CA:BERKELEY	100181-110381	4.48	5.9	5.65	5.9
CA:BERLELEY	110381-120181	4.19	8.7	6.23	8.7
CA:BERKELEY	120181- 10482	6.20	21.0	7.60	21.0
CO:DENVER	93081-110281	11.77	4.0	14.86	4.0
CO:DENVER	100281-120381	10.01	6.1	6.73	6.1
CO:DENVER	120381- 10882	13.59	4.4	15.73	4.4
FL:ORLANDO	100181-110181	5.46	4.6	7.34	4.6
FL:ORLANDO	110981-120181	2.96	5.3	5.62	5.3
FL:ORLANDO	120181- 10482	4.66	5.7	5.71	5.7
ID:BOISE	100581-110481	9.22	4.7	12.81	4.7
ID:BOISE	110481-120881	10.07	13.0	12.34	13.0
ID:BOISE	120881- 10482	8.56	3.5	13.20	3.5
IL:CHICAGO	100281-110681	5.92	17.7	7.05	17.7
IL:CHICAGO	110681-120481	4.73	5.0	7.04	5.0
IL:CHICAGO	120481- 10582	4.92	4.7	6.40	4.7
ND:BISMARCK	102781-120881	12.13	7.6	12.03	7.6
ND:BISMARCK	120881- 11282	7.81	4.3	9.30	4.3
NJ:TRENTON	100181-110281	7.33	11.9	9.55	11.9
NJ:TRENTON	110281-120181	7.23	4.5	10.39	4.5
NJ:TRENTON	120181-123181	6.52	12.5	9.06	12.5
NM:SANTA FE	92581-111381	16.00	5.5	13.61	5.5
NM:SANTA FE	111381-121481	9.77	3.4	13.14	3.4
NM:SANTA FE	121481- 20482	17.89	4.0	14.33	4.0
NV:LAS VEGAS	93081-103081	4.90	14.4	7.04	14.4
NV:LAS VEGAS	103081-113081	5.43	5.3	7.30	5.3
NV:LAS VEGAS	113081-123181	5.31	11.9	7.14	11.9
NY:NEW YORK	100181-110481	6.13	6.7	7.52	6.7
NY:NEW YORK	110481-120381	5.67	7.7	8.15	7.7
NY:NEW YORK	120381- 10582	6.13	10.2	7.74	10.2
OH:COLUMBUS	100181-102981	4.88	5.6	7.27	5.6
OH:COLUMBUS	102981-120281	5.92	4.0	7.25	4.0
OH:COLUMBUS	120281-123181	4.64	5.4	6.67	5.4
OK:OKLAHOMA CITY	100581-110981	6.81	11.6	8.11	11.6
OK:OKLAHOMA CITY	110981-120881	5.43	4.8	7.81	4.8
OR:PORTLAND	100281-110281	5.61	5.5	7.53	5.5
OR:PORTLAND	110281-120181	5.78	5.4	8.31	5.4
OR:PORTLAND	120181- 10482	6.45	6.7	7.91	6.7
PA:HARRISBURG	100281-110681	5.58	6.1	6.64	6.1
PA:HARRISBURG	110681-120181	4.02	6.9	6.71	6.9
PA:HARRISBURG	120181-122981	4.35	5.5	6.47	5.5
PA:PITTSBURGH	100281-110281	8.95	4.5	12.03	4.5
PA:PITTSBURGH	110281-120381	9.51	6.1	12.79	6.1
PA:PITTSBURGH	120381- 10582	9.79	3.5	12.36	3.5
RI:PROVIDENCE	100881-110581	7.20	4.4	10.72	4.4
RI:PROVIDENCE	110581-121681	10.14	3.9	10.31	3.9
RI:PROVIDENCE	121681- 11282	6.59	5.4	10.17	5.4

TABLE 17 (CONTINUED)

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE		EXPOSURE RATE	
		MR ± 2s		MICRO R/HR ± 2s	
SC:BARNWELL	92481-102981	7.15	6.2	8.51	6.2
SC:BARNWELL	102981-120381	6.62	5.5	7.88	5.5
SC:BARNWELL	120381-123181	5.26	4.9	7.83	4.9
SC:COLUMBIA	92581-102781	6.79	5.1	8.84	5.1
SC:COLUMBIA	102681-120181	7.49	6.7	8.67	6.7
SC:COLUMBIA	120181-123081	6.36	5.0	9.13	5.0
TN:KNOXVILLE	100581-102681	5.09	7.8	10.09	7.8
TN:KNOXVILLE	102681-113081	7.87	3.9	9.36	3.9
TN:KNOXVILLE	113081-122881	6.35	5.1	9.44	5.1
VA:RICHMOND	100581-103081	5.40	4.4	8.99	4.4
VA:RICHMOND	103081-113081	6.52	7.4	8.76	7.4
VA:RICHMOND	120181-123181	6.56	5.2	9.11	5.2
VT:MONTPELIER	100581-111081	7.54	6.8	8.72	6.8
VT:MONTPELIER	111081-122881	10.40	5.4	9.03	5.4

s SIGMA ERROR (IN PERCENT)

SECTION IV. Milk Program

Pasteurized Milk

This is a cooperative program of the EPA, ORP and the Dairy and Lipid Products Branch, Milk Sanitation Section, Food and Drug Administration. Milk is a reliable indicator of the general populations intake of radionuclides since it is consumed by a large segment of the population and contains several of the biologically important contaminants resulting from environmental releases from nuclear activities. A primary function of this program is to obtain reliable monitoring data relative to current radionuclide concentrations and determine any long-term trends.

Monthly samples are collected at 65 sampling sites with one or more located in each state, Puerto Rico, and the Panama Canal. These are composite samples representing more than 80 percent of the milk consumed in a given population center.

These samples are analyzed for iodine-131, barium-140, cesium-137, and potassium. All 65 samples are analyzed annually in July for strontium-89, and strontium-90. Also, for the first month of the three quarters beginning January, April and October, 10 regional composite samples of milk made up from the states within each of EPA's 10 regions are analyzed for strontium-89 and strontium-90.

Iodine-131, barium-140, cesium-137 and potassium are determined by gamma spectral analysis. Strontium-89 and strontium-90 are determined by beta counting a total strontium precipitate which has been chemically separated by ion-exchange.

The values from the pasteurized milk samples for October - December 1981 are shown in Tables 18 - 20. Strontium values from regional composite samples collected October - December 1981 are shown in Table 21.

Tritium in Milk

It was previously proposed to analyze all 65 milk samples for tritium in the aqueous and organic phases, on an annual basis (on the April sample). The EERF is currently evaluating alternative analytical techniques anticipating that these analyses will begin during the coming year.

TABLE 18

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

OCTOBER 1981

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
AL:MONTGOMERY	10/15/81	1.29 0.15	1. 11.	-26. 13.	-4. 9.
AR:LITTLE ROCK	10/14/81	1.34 0.22	7. 15.	-17. 19.	1. 13.
CA:LOS ANGELES	10/15/81	1.36 0.12	1. 7.	-11. 8.	-6. 7.
CA:SACRAMENTO	10/ 9/81	1.43 0.12	2. 7.	-10. 8.	-5. 7.
CA:SAN FRANCISCO	10/ 7/81	1.45 0.08	0. 5.	-11. 7.	0. 5.
CO:DENVER	10/27/81	1.25 0.12	3. 7.	-4. 8.	-2. 7.
CT:HARTFORD	10/ 6/81	1.42 0.12	4. 7.	-1. 8.	-4. 7.
DE:WILMINGTON	10/ 5/81	1.30 0.12	5. 7.	-4. 8.	2. 7.
GA:ATLANTA	10/13/81	1.33 0.22	1. 15.	-18. 19.	3. 13.
IA:DES MOINES	10/12/81	1.38 0.12	-2. 7.	-18. 9.	1. 7.
ID:IDAHO FALLS	10/ 7/81	1.43 0.13	-1. 8.	-9. 11.	-1. 8.
IL:CHICAGO	10/ 5/81	1.32 0.08	2. 5.	-2. 6.	0. 5.
IN:INDIANAPOLIS	10/ 5/81	1.36 0.12	5. 7.	-3. 8.	5. 7.
KS:WICHITA	10/ 7/81	1.34 0.12	4. 7.	-6. 8.	3. 7.
KY:LOUISVILLE	10/ 5/81	1.46 0.12	-1. 7.	0. 8.	-1. 7.
LA:NEW ORLEANS	10/22/81	1.33 0.22	5. 15.	-9. 19.	1. 13.
MA:BOSTON	10/ 6/81	1.35 0.12	9. 7.	-6. 8.	3. 7.
MD:BALTIMORE	10/ 2/81	1.54 0.12	-1. 7.	0. 8.	3. 7.
ME:PORTLAND	10/ 6/81	1.40 0.22	-3. 15.	-10. 19.	10. 13.
MI:DETROIT	10/ 8/81	1.44 0.22	14. 15.	-16. 19.	0. 13.
MN:MINN/ST. PAUL	10/ 3/81	1.32 0.12	3. 7.	-3. 8.	2. 7.
MO:KANSAS CITY	10/ 9/81	1.31 0.12	-3. 7.	0. 8.	1. 7.
MO:ST. LOUIS	10/ 7/81	1.33 0.12	1. 7.	-3. 8.	-5. 7.
MS:JACKSON	10/12/81	1.28 0.22	2. 15.	-17. 19.	-8. 13.
NC:CHARLOTTE	10/ 6/81	1.43 0.22	13. 15.	6. 20.	10. 13.
NE:OMAHA	10/ 9/81	1.17 0.08	-2. 5.	-5. 6.	-5. 5.
NH:MANCHESTER	10/ 6/81	1.36 0.12	8. 7.	-11. 8.	0. 7.
NJ:TRENTON	10/ 1/81	1.42 0.22	-4. 15.	-19. 19.	-6. 13.
NM:ALBUQUERQUE	10/ 5/81	1.44 0.12	4. 7.	-8. 8.	8. 7.
NV:LAS VEGAS	10/26/81	1.24 0.21	-3. 15.	-15. 19.	-9. 13.
NY:BUFFALO	10/20/81	1.37 0.22	0. 15.	-8. 19.	-3. 13.
NY:NEW YORK CITY	10/ 5/81	1.39 0.12	6. 7.	1. 8.	0. 7.
NY:SYRACUSE	10/ 5/81	1.44 0.08	2. 5.	-7. 6.	0. 5.
OH:CINCINNATI	10/ 5/81	1.39 0.12	0. 7.	-1. 8.	1. 7.
OH:CLEVELAND	10/ 7/81	1.43 0.08	-2. 5.	-2. 6.	-3. 5.
OK:OKLAHOMA CITY	10/19/81	1.45 0.22	1. 15.	-15. 19.	1. 13.
OR:PORTLAND	10/ 6/81	1.32 0.12	1. 7.	-2. 8.	-5. 7.
PA:PHILADELPHIA	10/ 5/81	1.40 0.12	2. 7.	0. 8.	1. 7.
PA:PITTSBURGH	10/ 6/81	1.28 0.08	2. 5.	-4. 6.	-2. 5.
PC:ANCON	10/16/81	1.49 0.12	14. 7.	-4. 8.	0. 7.

TABLE 18 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

OCTOBER 1981

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
TN:CHATTANOOGA	10/13/81	1.28 0.21	3. 15.	-26. 19.	8. 13.
TN:KNOXVILLE	10/ 6/81	1.25 0.12	4. 7.	-3. 8.	1. 7.
TN:MEMPHIS	10/28/81	1.57 0.22	15. 15.	-12. 19.	-4. 13.
TX:AUSTIN	10/15/81	1.26 0.21	-2. 14.	-50. 23.	-6. 13.
TX:FT. WORTH	10/15/81	1.30 0.15	-6. 10.	-27. 15.	-3. 9.
UT:SALT LAKE CITY	10/ 5/81	1.39 0.08	0. 5.	-7. 6.	-3. 5.
VA:NORFOLK	10/15/81	1.52 0.22	-12. 14.	-20. 19.	5. 13.
VT:BURLINGTON	10/15/81	1.41 0.08	-2. 5.	-7. 6.	-4. 5.
WI:MILWAUKEE	10/ 1/81	1.35 0.12	5. 7.	-2. 8.	4. 7.
WY:LARAMIE	10/14/81	1.33 0.22	-2. 15.	-9. 19.	4. 13.

s SIGMA COUNTING ERROR

TABLE 19

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

NOVEMBER 1981

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
AL:MONTGOMERY	11/ 5/81	1.22 0.21	14. 15.	-13. 19.	4. 13.
AR:LITTLE ROCK	11/ 9/81	1.31 0.15	3. 11.	-9. 14.	3. 9.
CA:LOS ANGELES	11/12/81	1.19 0.15	2. 11.	3. 14.	-6. 9.
CA:SACRAMENTO	11/ 3/81	1.47 0.22	3. 15.	-9. 19.	-7. 13.
CA:SAN FRANCISCO	11/ 6/81	1.37 0.22	2. 15.	-13. 19.	13. 13.
CO:DENVER	11/25/81	1.32 0.12	2. 7.	-4. 8.	1. 7.
CT:HARTFORD	11/ 4/81	1.40 0.12	-2. 7.	1. 8.	-1. 7.
DC:WASHINGTON	11/ 6/81	1.52 0.22	-8. 14.	-25. 19.	1. 13.
DE:WILMINGTON	11/10/81	1.46 0.22	10. 15.	-26. 19.	-8. 13.
FL:TAMPA	11/ 2/81	1.36 0.22	16. 15.	-15. 19.	-2. 13.
GA:ATLANTA	11/ 4/81	1.37 0.16	6. 11.	-10. 13.	5. 9.
HI:HONOLULU	11/ 3/81	1.42 0.22	3. 15.	-25. 19.	0. 13.
IA:DES MOINES	11/ 2/81	1.34 0.22	-7. 14.	-8. 19.	-2. 13.
ID:IDAHO FALLS	11/ 2/81	1.14 0.21	11. 15.	-14. 19.	-12. 13.
IL:CHICAGO	11/ 1/81	1.56 0.22	1. 15.	-12. 19.	2. 13.
KS:WICHITA	11/ 4/81	1.39 0.22	11. 15.	-8. 19.	3. 13.
KY:LOUISVILLE	11/ 2/81	1.32 0.22	-1. 15.	-11. 19.	-4. 13.
MA:BOSTON	11/ 3/81	1.37 0.22	3. 15.	-10. 19.	-4. 13.
MD:BALTIMORE	11/ 6/81	1.43 0.08	2. 5.	-6. 6.	2. 5.
ME:PORTLAND	11/ 3/81	1.35 0.12	4. 7.	-5. 8.	3. 7.
MI:DETROIT	11/ 4/81	1.49 0.12	-3. 7.	-3. 8.	0. 7.
MI:GRAND RAPIDS	11/ 2/81	1.25 0.21	0. 15.	-5. 19.	-3. 13.
MN:MINNEAPOLIS	11/ 2/81	1.36 0.22	0. 15.	-20. 19.	-9. 13.
MN:ST. PAUL	11/ 4/81	1.31 0.22	7. 15.	-8. 19.	-10. 13.
MO:KANSAS CITY	11/ 6/81	1.58 0.22	-8. 15.	-9. 19.	1. 13.
MO:ST. LOUIS	11/ 4/81	1.25 0.15	12. 11.	-12. 13.	-1. 9.
MS:JACKSON	11/ 2/81	1.33 0.22	-1. 15.	-10. 19.	-4. 13.
MT:HELENA	11/ 2/81	1.52 0.22	9. 15.	-10. 19.	12. 13.
NE:OMAHA	11/ 6/81	1.15 0.21	6. 15.	-18. 19.	5. 13.
NH:MANCHESTER	11/ 2/81	1.39 0.07	1. 4.	-2. 5.	0. 4.
NJ:TRENTON	11/ 5/81	1.34 0.12	7. 7.	-1. 8.	2. 7.
NV:LAS VEGAS	11/ 5/81	1.26 0.12	7. 7.	-6. 8.	4. 7.
NY:NEW YORK CITY	11/ 2/81	1.35 0.22	18. 15.	2. 20.	-4. 13.
NY:SYRACUSE	11/ 9/81	1.40 0.12	3. 7.	-3. 8.	0. 7.
OH:CINCINNATI	11/ 2/81	1.38 0.22	1. 15.	-8. 19.	0. 13.
OH:CLEVELAND	11/ 9/81	1.32 0.22	9. 15.	-12. 19.	4. 13.
OK:OKLAHOMA CITY	11/16/81	1.54 0.22	6. 15.	-17. 19.	6. 13.
OR:PORTLAND	11/ 3/81	1.51 0.22	0. 15.	-7. 19.	-3. 13.
PA:PHILADELPHIA	11/ 4/81	1.30 0.22	4. 15.	-3. 19.	2. 13.
PA:PITTSBURGH	11/ 3/81	1.41 0.22	7. 15.	-7. 19.	-4. 13.
PC:CRISTOBAL	11/13/81	1.39 0.22	10. 15.	-8. 19.	-2. 13.
PR:SAN JUAN	11/20/81	1.30 0.15	13. 11.	-6. 14.	-4. 9.
SC:CHARLESTON	11/10/81	1.36 0.22	5. 15.	0. 20.	4. 13.
SD:RAPID CITY	11/ 5/81	1.55 0.16	1. 11.	-18. 13.	5. 9.

TABLE 19 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

NOVEMBER 1981

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
TN:CHATTANOOGA	11/ 2/81	1.40 0.12	4. 7.	-5. 8.	-2. 7.
TN:KNOXVILLE	11/ 2/81	1.25 0.21	-2. 15.	-8. 19.	1. 13.
TN:MEMPHIS	11/18/81	1.38 0.12	4. 7.	-5. 8.	3. 7.
UT:SALT LAKE CITY	11/ 1/81	1.23 0.21	2. 15.	-8. 19.	-1. 13.
VA:NORFOLK	11/18/81	1.46 0.12	7. 7.	-2. 8.	1. 7.
VT:BURLINGTON	11/ 6/81	1.42 0.12	5. 7.	-8. 8.	-2. 7.
WA:SEATTLE	11/12/81	1.34 0.08	3. 5.	5. 6.	-2. 5.
WA:SPOKANE	11/ 2/81	1.42 0.22	4. 15.	-4. 19.	-7. 13.
WI:MILWAUKEE	11/ 2/81	1.34 0.16	1. 11.	-7. 13.	-4. 9.
WY:LARAMIE	11/ 4/81	1.27 0.12	4. 7.	-5. 8.	2. 7.

s SIGMA COUNTING ERROR

TABLE 20

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

DECEMBER 1981

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
AL:MONTGOMERY	12/ 9/81	1.46 0.12	4. 7.	-1. 8.	-1. 7.
AR:LITTLE ROCK	12/ 7/81	1.37 0.12	5. 7.	-1. 8.	4. 7.
CA:LOS ANGELES	12/ 4/81	1.43 0.12	-1. 7.	2. 8.	-2. 7.
CA:SACRAMENTO	12/ 9/81	1.43 0.22	-6. 15.	1. 20.	-2. 13.
CA:SAN FRANCISCO	12/15/81	1.43 0.12	-1. 7.	-1. 8.	2. 7.
CO:DENVER	12/29/81	1.28 0.22	-1. 15.	8. 20.	-7. 13.
CT:HARTFORD	12/ 7/81	1.62 0.22	7. 15.	-12. 19.	5. 13.
DC:WASHINGTON	12/ 4/81	1.45 0.08	3. 5.	0. 6.	2. 5.
FL:TAMPA	12/ 2/81	1.38 0.12	9. 7.	3. 8.	2. 7.
HI:HONOLULU	12/ 1/81	1.33 0.12	1. 7.	6. 8.	2. 7.
IA:DES MOINES	12/14/81	1.44 0.12	3. 7.	-3. 8.	3. 7.
ID:IDAHO FALLS	12/ 7/81	1.48 0.22	-7. 15.	-8. 19.	-2. 13.
IL:CHICAGO	12/14/81	1.40 0.12	-1. 7.	2. 8.	1. 7.
KS:WICHITA	12/ 9/81	1.47 0.12	-2. 7.	-1. 8.	2. 7.
KY:LOUISVILLE	12/ 7/81	1.47 0.12	4. 7.	0. 8.	-3. 7.
LA:NEW ORLEANS	12/10/81	1.38 0.12	6. 7.	1. 8.	2. 7.
MA:BOSTON	12/ 8/81	1.52 0.12	9. 7.	0. 8.	1. 7.
MD:BALTIMORE	12/ 4/81	1.54 0.12	7. 7.	-1. 8.	-1. 7.
ME:PORTLAND	12/ 1/81	1.36 0.08	12. 5.	-1. 6.	0. 5.
MI:DETROIT	12/10/81	1.32 0.22	13. 15.	6. 20.	9. 13.
MI:GRAND RAPIDS	12/ 7/81	1.41 0.12	1. 7.	1. 8.	-3. 7.
MO:KANSAS CITY	12/11/81	1.36 0.08	5. 5.	2. 6.	0. 5.
MO:ST. LOUIS	12/ 2/81	1.37 0.12	7. 7.	-7. 8.	2. 7.
MS:JACKSON	12/ 7/81	1.48 0.12	4. 7.	-5. 8.	1. 7.
MT:HELENA	12/ 7/81	1.38 0.08	0. 5.	-2. 6.	2. 5.
NC:CHARLOTTE	12/ 1/81	1.36 0.16	1. 11.	-6. 14.	1. 9.
NE:OMAHA	12/11/81	1.41 0.12	4. 7.	-2. 8.	-1. 7.
NH:MANCHESTER	12/ 7/81	1.53 0.12	-2. 7.	2. 8.	1. 7.
NJ:TRENTON	12/ 3/81	1.66 0.12	2. 7.	3. 8.	-2. 7.
NV:LAS VEGAS	12/ 3/81	1.38 0.16	5. 11.	-2. 14.	2. 9.
NY:BUFFALO	12/ 1/81	1.35 0.12	-2. 7.	1. 8.	-2. 7.
NY:NEW YORK CITY	12/ 7/81	1.36 0.08	2. 5.	0. 6.	2. 5.
NY:SYRACUSE	12/ 8/81	1.45 0.12	1. 7.	-2. 8.	0. 7.
OH:CINCINNATI	12/ 7/81	1.47 0.08	0. 5.	0. 6.	2. 5.
OH:CLEVELAND	12/ 7/81	1.46 0.12	1. 7.	1. 8.	2. 7.
OK:OKLAHOMA CITY	12/23/81	1.59 0.12	2. 7.	3. 8.	1. 7.
OR:PORTLAND	12/ 7/81	1.30 0.08	2. 5.	-2. 6.	0. 5.
PA:PHILADELPHIA	12/ 7/81	1.47 0.12	2. 7.	1. 8.	-3. 7.
PA:PITTSBURGH	12/ 9/81	1.38 0.12	-2. 7.	1. 8.	1. 7.
PC:CRISTOBAL	12/15/81	1.38 0.12	3. 7.	-3. 8.	5. 7.
SC:CHARLESTON	12/16/81	1.32 0.12	6. 7.	-4. 8.	0. 7.
SD:RAPID CITY	12/ 2/81	1.34 0.12	7. 7.	6. 8.	0. 7.

TABLE 20 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

DECEMBER 1981

LOCATION	DATE COLLECTED	K g/l±2s	^{137}Cs pCi/l±2s	^{140}Ba pCi/l±2s	^{131}I pCi/l±2s
TN:CHATTANOOGA	12/ 7/81	1.38 0.22	17. 15.	-11. 19.	10. 13.
TN:KNOXVILLE	12/14/81	1.40 0.12	-2. 7.	-1. 8.	3. 7.
TN:MEMPHIS	12/10/81	1.36 0.12	4. 7.	-2. 8.	0. 7.
TX:AUSTIN	12/10/81	1.36 0.08	2. 5.	-2. 6.	1. 5.
UT:SALT LAKE CITY	12/ 7/81	1.35 0.12	-2. 7.	0. 8.	-1. 7.
VA:NORFOLK	12/11/81	1.53 0.12	-1. 7.	-1. 8.	2. 7.
VT:BURLINGTON	12/18/81	1.45 0.12	1. 7.	-1. 8.	-2. 7.
WI:MILWAUKEE	12/ 1/81	1.39 0.12	1. 7.	-6. 8.	3. 7.
WV:CHARLESTON	12/15/81	1.40 0.12	1. 7.	2. 8.	2. 7.
WY:LARAMIE	12/10/81	1.45 0.12	5. 7.	0. 8.	0. 7.

s SIGMA COUNTING ERROR

TABLE 21

STRONTIUM-90 AND STRONTIUM-89 IN PASTEURIZED MILK

EPA REGIONAL COMPOSITES

OCTOBER - DECEMBER 1981

EPA REGION	^{90}Sr pCi/l ± 2s		^{89}Sr pCi/l ± 2s*	
I	3.7	1.2	0.	0.
II	3.2	1.1	1.	0.
III	3.0	1.0	2.	1.
IV	3.4	1.0	2.	0.
V	3.0	1.0	1.	0.
VI	2.8	1.1	1.	0.
VII	2.6	1.0	1.	0.
VIII	2.0	1.1	0.	0.
IX	0.4	0.4	1.	1.
X	2.6	1.1	0.	0.

s SIGMA COUNTING ERROR
s* ANALYTICAL ERROR TERM WHICH CLOSELY APPROXIMATES THE COUNTING ERROR

Plutonium and Uranium in Milk

Ten milk sampling sites near plutonium handling facilities, plus 2 sites chosen for background information, are analyzed annually for plutonium and uranium. Analytical techniques approximate those used for air filters.

Only plutonium analyses were performed on the 1974 samples, but due to increased emphasis on levels of natural radioactivity, uranium analyses were included for 1975 - 1976 samples. Data for samples collected April 1978 were reported in ERD 14.

Iodine-129 in Milk

These analyses were designed to assess environmental levels of iodine-129 around nuclear fuel reprocessing facilities. Annual samples collected from Montgomery, Alabama (background); Idaho Falls, Idaho; Chicago, Illinois; Buffalo, New York; and Charleston, South Carolina; are analyzed for iodine-129 and stable iodine-127. Results for 1978 were reported in ERD 17.

Carbon-14 in Milk

Nine stations, chosen for wide geographical distribution, contribute milk samples for annual analysis for carbon-14. These samples have monitored the carbon-14 levels in the food chain resulting from nuclear testing.

Analysis consists of combusting the samples and measuring released carbon dioxide through liquid scintillation.

The results of carbon-14 analysis on samples collected during May 1974 were reported in ERD Report 2, September 1975.

SECTION V. Human Bone Program

The Human Bone Program (formerly Human Bone Network) began operation in 1961 to obtain data on the concentration of strontium-90 in man by age and geographical region. The target population for this network was comprised of children and young adults up to 25 years of age. The bone specimens were limited to accident victims or persons who had died of an acute disease process that was not likely to impair bone metabolism.

The following were operational characteristics of this program:

All samples were composited according to age and geographical locations.

Strontium-90, plutonium-238 and -239, and calcium analyses were performed annually on the composite samples.

No additional bone samples have been procured since FY-75.

A final report has been submitted to the Health Physics Journal for publication.

Radiologic Health Section
California Department of Health

California Air Sampling Program

The Radiologic Health Section of the California Department of Health with the assistance of several cooperating agencies maintains a statewide air sampling network. One of the objectives of this program is to measure and evaluate the contribution of fixed effluent sources to particulate activity in the air. Data from air samplers placed in proximity to nuclear facilities are compared with information obtained from similar equipment in communities close to the facilities and at several "background" or control stations.

Airborne particles are collected by a continuous sampling of air filtered through a 47 millimeter membrane filter, 0.8 micrometer pore size, using a Gast air pump that provides an average sampling rate of 40 liters per minute. Air volumes are measured with a direct reading gas meter. Filters are replaced when approximately 300 cubic meters of air are collected, i.e., on a weekly or semi-weekly schedule. Charcoal cartridges mounted behind the filters at 10 of the 18 stations are replaced weekly.

All air samples are sent to the Department's Sanitation and Radiation Laboratory, where the filters are analyzed for gross beta radioactivity 72 hours after collection. Alpha activity is determined weekly on ashed filters. Gamma spectroscopy and an analysis for strontium-89 and strontium-90 are normally performed on quarterly composites from each location. Immediate gamma scans are run on any samples for which abnormal gross activity values are observed. Charcoal cartridges are analyzed for radioiodines by gamma spectroscopy as soon as received.

Data will be published as received.

Radionuclides in California Milk

Although milk is only one of the sources of dietary intake of environmental radioactivity, it is the food item that is most useful as an indicator of the general population's intake of radionuclide contaminants resulting from environmental releases. The objective of this milk sampling network is to obtain information on current radionuclide concentrations and long-term trends. From this information the need for further investigation or corrective public health action can be determined.

The California network consists of 10 stations, six of which are from dairies close to major nuclear facilities, and the other four represent controls, composited from local milksheds in similar geographic locations from the plants. Samples are obtained quarterly and analyzed immediately upon receipt.* Results are reported as pCi/l with an error of two standard deviations.

Data will be published as received.

*Radionuclides are determined by gamma spectroscopy, with the exception of iodine-131, which is analyzed in accordance with procedures specified in USNRC Regulatory Guide 4.3, and strontium-89 and strontium-90, which are determined by radiochemical technique.

Radiological Health Laboratory
Indiana State Board of Health

Indiana Milk Analysis Program

In order to evaluate the fallout on Indiana pasturelands, the State has implemented a program whereby monthly milk samples from five geographical areas are sent to the Radiological Health Laboratory of the State Board of Health. The milk in these samples is bottled on the same date in all five areas to provide uniform time from pasture to the lab.

Once in the laboratory, the milk is first analyzed by gamma spectroscopy for iodine-131, barium-140, cesium-137, and potassium-40. A one gallon sample is analyzed on a 3" x 3" NaI(Tl) scintillation crystal for 4800 seconds. A background sample of 48,000 seconds is also run. The data are analyzed to give pCi/l for each radionuclide.

A quarterly composite sample is saved and run for strontium-89 and -90 by ion exchange method.

Data for the third and fourth quarters of 1981 are shown in Tables 22 -23.

TABLE 22

INDIANA MILK ANALYSIS PROGRAM

(Third and Fourth Quarters of 1981)

Concentrations of Selected Gamma Radionuclides in Pasteurized Milk

	Location	Date	pCi/l I-131	pCi/l Ba-140	pCi/l Cs-137	g/l K
IN:	Evansville	7/81	5 ± 5	0 ± 5	10 ± 5	1.19 ± 0.12
	Fort Wayne	7/81	5 ± 5	0 ± 5	10 ± 5	1.24 ± 0.12
	Indianapolis	7/81	0 ± 5	0 ± 5	15 ± 5	1.15 ± 0.12
	Rochester	7/81	0 ± 5	0 ± 5	15 ± 5	1.16 ± 0.12
	Seymour	7/81	0 ± 5	0 ± 5	15 ± 5	1.19 ± 0.12
IN:	Evansville	8/81	5 ± 5	0 ± 5	10 ± 5	1.16 ± 0.12
	Fort Wayne	8/81	5 ± 5	10 ± 5	15 ± 5	1.02 ± 0.12
	Indianapolis	8/81	10 ± 5	0 ± 5	10 ± 5	1.19 ± 0.12
	Rochester	8/81	5 ± 5	5 ± 5	15 ± 5	1.19 ± 0.12
	Seymour	8/81	0 ± 5	5 ± 5	10 ± 5	1.02 ± 0.12
IN:	Evansville	9/81	0 ± 5	0 ± 5	10 ± 5	1.16 ± 0.12
	Fort Wayne	9/81	0 ± 5	0 ± 5	10 ± 5	1.08 ± 0.12
	Indianapolis	9/81	0 ± 5	0 ± 5	10 ± 5	1.12 ± 0.12
	Rochester	9/81	0 ± 5	0 ± 5	5 ± 5	1.32 ± 0.12
	Seymour	9/81	0 ± 5	5 ± 5	20 ± 6	1.12 ± 0.12
IN:	Evansville	10/81	0 ± 5	0 ± 5	10 ± 5	1.32 ± 0.12
	Fort Wayne	10/81	15 ± 5	0 ± 5	15 ± 5	1.30 ± 0.12
	Indianapolis	10/81	0 ± 5	0 ± 5	5 ± 5	1.25 ± 0.12
	Rochester	10/81	0 ± 5	0 ± 5	0 ± 5	1.16 ± 0.12
	Seymour	10/81	5 ± 5	5 ± 5	10 ± 5	1.19 ± 0.12
IN:	Evansville	11/81	5 ± 5	0 ± 5	5 ± 5	1.22 ± 0.12
	Fort Wayne	11/81	5 ± 5	0 ± 5	10 ± 5	1.26 ± 0.12
	Indianapolis	11/81	10 ± 5	0 ± 5	5 ± 5	1.26 ± 0.12
	Rochester	11/81	5 ± 5	0 ± 5	5 ± 5	1.24 ± 0.12
	Seymour	11/81	0 ± 5	0 ± 5	5 ± 5	1.25 ± 0.12
IN:	Evansville	12/81	15 ± 5	0 ± 5	15 ± 5	1.19 ± 0.12
	Fort Wayne	12/81	15 ± 5	0 ± 5	15 ± 5	1.19 ± 0.12
*	Indianapolis	12/81	---	---	---	---
*	Rochester	12/81	---	---	---	---
	Seymour	12/81	10 ± 5	5 ± 5	15 ± 5	1.19 ± 0.12

* Denotes sample not taken

TABLE 23

Concentrations of ^{90}Sr and ^{89}Sr in Pasteurized Milk

(pCi/l ± 2 Sigma Counting Error)

	Location	Date	^{90}Sr	^{89}Sr
IN:	Evansville	7/81	1 ± 0.5	0 ± 0.3
	Fort Wayne	7/81	1 ± 0.5	0 ± 0.3
	Indianapolis	7/81	2 ± 0.5	0 ± 0.3
	Rochester	7/81	2 ± 0.5	0 ± 0.3
	Seymour	7/81	1 ± 0.5	0 ± 0.3
IN:	Evansville	8/81	2 ± 0.5	0 ± 0.3
	Fort Wayne	8/81	3 ± 0.6	0 ± 0.3
	Indianapolis	8/81	2 ± 0.5	0 ± 0.3
	Rochester	8/81	1 ± 0.5	0 ± 0.3
	Seymour	8/81	1 ± 0.5	0 ± 0.3
IN:	Evansville	9/81	6 ± 0.9	0 ± 0.3
	Fort Wayne	9/81	4 ± 0.7	1 ± 0.5
	Indianapolis	9/81	3 ± 0.6	1 ± 0.5
	Rochester	9/81	4 ± 0.7	0 ± 0.3
	Seymour	9/81	4 ± 0.7	0 ± 0.3
IN:	Evansville	10/81	3 ± 0.6	0 ± 0.3
	Fort Wayne	10/81	4 ± 0.7	0 ± 0.3
	Indianapolis	10/81	3 ± 0.6	0 ± 0.3
	Rochester	10/81	4 ± 0.7	0 ± 0.3
	Seymour	10/81	3 ± 0.6	0 ± 0.3
IN:	Evansville	11/81	13 ± 1.7	0 ± 0.3
	Fort Wayne	11/81	9 ± 1.0	0 ± 0.3
	Indianapolis	11/81	6 ± 0.7	0 ± 0.3
	Rochester	11/81	6 ± 0.7	0 ± 0.3
	Seymour	11/81	13 ± 0.7	0 ± 0.3
IN:	Evansville	12/81	6 ± 0.7	0 ± 0.3
	Fort Wayne	12/81	6 ± 0.7	0 ± 0.3
*	Indianapolis	12/81	---	---
*	Rochester	12/81	---	---
	Seymour	12/81	5 ± 0.8	0 ± 0.3

* Denotes sample not taken

Radiological Health Division
State Hygienic Laboratory of Iowa

Iowa Water Sampling Program

The radiological Health Division of the State Hygienic Laboratory of Iowa with the assistance of the State Department of Environmental Quality (DEQ) maintains a state-wide water sampling program of community drinking waters, surface waters and precipitation. All analyses with the exception of the sequential Ra-226, -228 analyses are performed according to "Standard Methods for the Examination of Water and Wastewater", 14th edition. The sequential analyses for radiums are performed according to the EPA publication, EPA-600/4-75-008, "Interim Radiochemical Methodology for Drinking Water."

The drinking water samples are collected by DEQ regional personnel and sent to the State Hygienic Laboratory where they are preserved with HCl. These waters are analyzed for gross alpha and gross beta radioactivity as a screening process. Subsequent analyses for Ra-226, Ra-228, Sr-90 are performed if screening levels are exceeded. Radium levels are of primary concern in Iowa drinking waters as those levels are elevated in deep geologic aquifers within the state.

Surface waters are collected at eleven sites throughout the state with site selection being determined by proximity upstream and downstream to nuclear power plants in Iowa or those plants discharging into rivers which are natural borders with adjoining states. Gross alpha, gross beta, and tritium are the routine radionuclide analyses for these samples. Strontium is of interest when gross beta screening levels are exceeded or if nuclear weapons testing necessitates monitoring to determine its impact on the environment.

Background Radiation Levels, Tritium, for the first quarter, 1981, are shown in Table 24.

Gross Radiation in Precipitation for the first quarter, 1981, is shown in Table 25.

Gross Activity in Surface Water reported as pCi/l for the first quarter, 1981, is shown in Table 26.

Gross Beta Activity in Air for the first quarter, 1981 is shown in Table 27.

SDWA (Safe Drinking Water Act) analyses for January, February and March, 1981, are shown in Tables 28, 29, and 30 respectively.

SDWA Radiological analyses, quarterly recheck samples, for 1980 are shown in Table 31.

SDWA Radiological analyses for March, 1981, are shown in Table 32.

DEQ Mineral Samples for January, February, and March 1981, are shown in Tables 33, 34, and 35 respectively.

The concentrations of Sr-90 in Iowa Milk Samples are shown in Table 36.

TABLE 24

UNIVERSITY HYGIENIC LABORATORY
STATEWIDE DYNAMIC SURFACE WATER REPORT
Background Radiation Levels, Tritium

Data for 1st Quarter 1981

River	City	Dates Collected Composite Samples	Date Counted	^{3}H Activity nCi/l
Cedar	Cedar Rapids	1-6, 13, 20, 27-81	04-15-81	<1.20
	Cedar Rapids	2-3, 10, 17, 24-81		
	Cedar Rapids	3-3, 10, 17, 24, 31-81		
Cedar	Vinton	3-2, 9, 16, 23, 30-81	04-15-81	<1.20
Des Moines	Des Moines	1-14-81	04-15-81	<1.20
	Des Moines	2-14-81	04-15-81	<1.20
	Des Moines	3-3-81	04-15-81	<1.20
Iowa	Iowa City	1-6-81	04-15-81	<1.20
	Iowa City	2-12-81	04-15-81	<1.20
	Iowa City	3-4-81	04-15-81	<1.20
Mississippi	Davenport	1-8, 16, 22, 29-81	04-15-81	<1.20
	Davenport	2-4, 12, 19-81	04-15-81	<1.20
Mississippi	Dubuque	1-2, 9, 15, 22, 29-81	04-15-81	<1.20
	Dubuque	2-6, 26-81	04-15-81	<1.20
	Dubuque	3-5, 13, 20, 27-81	04-15-81	<1.20
Mississippi	Lansing	1-5, 12, 19, 26-81	04-15-81	<1.20
	Lansing	2-2, 9, 16, 23-81	04-15-81	<1.20
	Lansing	3-2, 9, 16, 30-81	04-15-81	<1.20
Missouri	Council Bluffs	1-5, 13, 20, 26-81	04-15-81	<1.20
	Council Bluffs	2-9, 19, 23-81	04-15-81	<1.20
	Council Bluffs	3-2, 9, 16, 23, 30-81	04-15-81	<1.20
Missouri	Sioux City	1-5, 12, 19, 26-81	04-15-81	<1.20
	Sioux City	2-23-81	04-15-81	<1.20
	Sioux City	3-2, 9, 23, 30-81	04-15-81	<1.20
Nishnabotna	Hamburg	1-13-81	04-15-81	<1.20
	Hamburg	2-16-81	04-15-81	<1.20
	Hamburg	3-9-81	04-15-81	<1.20
Skunk	Ames	2-19, 26-81	04-15-81	<1.20
	Ames	3-5, 12, 19, 26-81	04-15-81	<1.20

TABLE 24 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
STATEWIDE DYNAMIC SURFACE WATER REPORT
Background Radiation Levels, Tritium

Data for 1st Quarter 1981

IOWA CITY PRECIPITATION

Date Collected	Date Counted	^{3}H Activity, nCi/l
02-02-81	04-15-81	<1.20
02-10-81	04-15-81	<1.20
02-23-81	04-15-81	<1.20

TABLE 25

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
IOWA CITY PRECIPITATION
GROSS RADIATION

Data for January, February, March 1981

RADIATION #	DATE SAMPLED	AMOUNT PRECIPITATION mm	WATER COLLECTED l	ACTIVITY IN pCi/l	
				ALPHA (DS)	BETA-GAMMA (DS)
17712	02-02-81	4.7	0.7	0.3	9
17772	02-10-81	4.0	0.6	0.3	15
17737	02-23-81	18	2.7	0.2	22
		Highest		0.3	22
		Lowest		0.2	9
		Average of 3		0.3	15
		Total amount collected	4.0		

TABLE 26

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL SURFACE WATER SURVEILLANCE
GROSS ACTIVITY REPORTED AS pCi/l

Data for January, February, March 1981

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RADIATION #	DATE SAMPLED	ALPHA ACTIVITY TS	ALPHA ACTIVITY DS	ALPHA ACTIVITY SS	BETA-GAMMA ACTIVITY TS	BETA-GAMMA ACTIVITY DS	BETA-GAMMA ACTIVITY SS
		SKUNK RIVER AT AMES					
17796	02-19-81	2.1	0.7	1.4	9	5	4
17839	02-26-81	1.8	1.1	0.7	9	7	2
17852	03-05-81	1.9	1.4	0.5	8	7	1
17902	03-12-81	2.5	2.2	0.3	10	6	4
17909	03-19-81	1.8	1.2	0.6	9	4	5
17949	03-26-81	1.4	1.2	0.2	5	3	2
	Average of 6	1.9	1.3	0.6	8	5	3
		CEDAR RIVER AT CEDAR RAPIDS					
17567	01-06-81	1.0	0.8	0.2	2	1	1
17605	01-13-81	0.6	0.6	Nil	5	5	Nil
17654	01-27-81	0.3	0.3	Nil	4	4	Nil
17655	01-20-81	0.7	0.6	0.1	3	3	Nil
17771	02-03-81	1.8	0.8	1.0	4	4	Nil
17791	02-17-81	0.9	0.6	0.3	4	4	Nil
17795	02-10-81	0.6	0.4	0.2	6	4	2
17837	02-24-81	0.8	0.6	0.2	6	5	1
17849	03-03-81	0.7	0.2	0.5	14	11	3
17903	03-10-81	0.5	0.3	0.2	5	4	1
17910	03-17-81	0.9	0.9	Nil	3	3	Nil
17936	03-24-81	2.3	0.8	1.5	12	5	7
18018	03-31-81	0.9	0.7	0.2	4	4	Nil
	Average of 13	0.9	0.6	0.3	6	4	2

TABLE 26 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL SURFACE WATER SURVEILLANCE
GROSS ACTIVITY REPORTED AS pCi/l

Data for January, February, March 1981

RADIATION #	DATE SAMPLED	ALPHA ACTIVITY TS	ALPHA ACTIVITY DS	ALPHA ACTIVITY SS	BETA-GAMMA ACTIVITY TS	BETA-GAMMA ACTIVITY DS	BETA-GAMMA ACTIVITY SS
		MISSOURI RIVER AT COUNCIL BLUFFS					
17574	01-05-81	7.6	7.1	0.5	8	7	1
17604	01-13-81	1.2	1.1	0.1	8	6	2
17612	01-20-81	2.7	1.8	0.9	9	7	2
17652	01-26-81	2.6	1.3	1.3	12	12	Nil
17778	02-09-81	3.1	2.5	0.6	11	8	3
17809	02-23-81	2.1	1.6	0.5	10	9	1
17851	02-19-81	2.8	1.9	0.9	9	6	3
17854	03-02-81	3.3	1.8	1.5	9	9	Nil
17906	03-09-81	1.0	0.8	0.2	7	5	2
17911	03-16-81	2.2	2.0	0.2	5	3	2
17934	03-23-81	2.7	2.0	0.7	7	7	Nil
17979	03-30-81	2.1	1.7	0.4	7	6	1
	Average of 12	2.8	2.1	0.7	9	7	2
		MISSISSIPPI RIVER AT DAVENPORT					
17568	01-08-81	0.5	0.5	Nil	3	3	Nil
17611	01-16-81	0.5	0.4	0.1	7	7	Nil
17657	01-22-81	0.3	0.3	Nil	2	2	Nil
17710	01-29-81	0.5	0.3	0.2	10	10	Nil
17748	02-04-81	0.4	0.2	0.2	4	3	1
17779	02-12-81	0.4	0.3	0.1	4	4	Nil
17790	02-19-81	1.0	0.7	0.3	6	4	2
	Average of 7	0.5	0.4	0.1	5	5	Nil
		DES MOINES RIVER AT DES MOINES					
17606	01-14-81	4.8	4.5	0.3	13	11	2
17776	02-14-81	2.2	2.1	0.1	10	8	2
17847	03-03-81	2.1	1.8	0.3	9	9	Nil
	Average of 3	3.0	2.8	0.2	11	9	2

TABLE 26 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL SURFACE WATER SURVEILLANCE
GROSS ACTIVITY REPORTED AS pCi/l

Data for January, February, March 1981

RADIATION	DATE SAMPLED	ALPHA ACTIVITY TS	ALPHA ACTIVITY DS	ALPHA ACTIVITY SS	BETA-GAMMA ACTIVITY TS	BETA-GAMMA ACTIVITY DS	BETA-GAMMA ACTIVITY SS
		MISSISSIPPI RIVER AT DUBUQUE					
17559	01-02-81	0.6	0.5	0.1	3	3	Nil
17573	01-09-81	0.5	0.4	0.1	6	4	2
17602	01-15-81	0.4	0.3	0.1	4	4	Nil
17636	01-22-81	0.2	0.2	Nil	4	3	1
17711	01-29-81	0.3	0.3	Nil	3	2	1
17764	02-06-81	0.3	0.2	0.1	4	4	Nil
17838	02-26-81	0.9	0.1	0.8	14	7	7
17853	03-05-81	0.4	0.3	0.1	7	6	1
17898	03-13-81	0.2	0.2	Nil	7	7	Nil
17912	03-20-81	0.4	0.2	0.2	9	7	2
17948	03-27-81	0.7	0.3	0.4	5	4	1
	Average of 11	0.5	0.3	0.2	6	5	1
		NISHNABOTNA RIVER AT HAMBURG					
17603	01-13-81	1.5	1.2	0.3	4	4	Nil
17789	02-16-81	1.4	0.8	0.6	11	8	3
17899	03-09-81	1.1	0.9	0.2	6	5	1
	Average of 3	1.3	1.0	0.3	7	6	1
		IOWA RIVER AT IOWA CITY					
17563	01-06-81	1.8	1.5	0.3	6	5	1
17771	02-12-81	1.0	0.6	0.4	6	5	1
17846	03-04-81	2.2	0.4	1.8	17	9	8
	Average of 3	1.7	0.8	0.9	10	6	4

TABLE 26 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL SURFACE WATER SURVEILLANCE
GROSS ACTIVITY REPORTED AS pCi/l

Data for January, February, March 1981

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RADIATION #	DATE SAMPLED	ALPHA ACTIVITY TS	ALPHA ACTIVITY DS	ALPHA ACTIVITY SS	BETA-GAMMA ACTIVITY TS	BETA-GAMMA ACTIVITY DS	BETA-GAMMA ACTIVITY SS
		MISSISSIPPI RIVER AT LANSING					
17556	01-05-81	0.5	0.5	Nil	5	4	1
17576	01-12-81	0.4	0.3	0.1	4	4	Nil
17610	01-19-81	0.5	0.4	0.1	2	2	Nil
17637	01-26-81	0.4	0.3	0.1	3	3	Nil
17713	02-02-81	0.6	0.6	Nil	4	4	Nil
17777	02-09-81	0.2	0.2	Nil	5	4	1
17788	02-16-81	0.4	0.3	0.1	3	3	Nil
17806	02-23-81	1.1	0.6	0.5	11	7	4
17845	03-02-81	0.6	0.2	0.4	9	7	2
17883	03-09-81	0.6	0.2	0.4	6	6	Nil
17908	03-16-81	0.6	0.2	0.4	7	5	2
17952	03-30-81	0.5	0.2	0.3	5	4	1
	Average of 12	0.5	0.3	0.2	5	4	1
		MISSOURI RIVER AT SIOUX CITY					
17565	01-05-81	2.8	2.1	0.7	10	6	4
17575	01-12-81	1.9	1.5	0.4	14	13	1
17609	01-19-81	8.6	8.4	0.2	8	6	2
17656	01-26-81	1.2	0.7	0.5	11	7	4
17807	02-23-81	9.4	4.0	5.4	10	9	1
17848	03-02-81	2.2	1.6	0.6	10	7	3
17901	03-09-81	2.2	1.9	0.3	5	5	Nil
17932	03-23-81	1.6	1.0	0.6	11	7	4
17980	03-30-81	3.3	2.5	0.8	16	13	3
	Average of 9	3.7	2.6	1.1	11	8	3

TABLE 26 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL SURFACE WATER SURVEILLANCE
GROSS ACTIVITY REPORTED AS pCi/l

Data for January, February, March 1981

RADIATION #	DATE SAMPLED	ALPHA ACTIVITY TS	DS	SS	BETA-GAMMA ACTIVITY TS	DS	SS
		CEDAR RIVER AT VINTON					
17844	03-02-81	1.7	0.3	1.4	16	10	6
17884	03-09-81	0.7	0.6	0.1	5	4	1
17907	03-16-81	1.2	0.9	0.3	4	4	Nil
17933	03-23-81	0.7	0.7	Nil	5	4	1
17953	03-30-81	0.6	0.3	0.3	4	3	1
	Average of 5	1.0	0.6	0.4	7	5	2

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
GROSS BETA ACTIVITY IN AIR
1ST QUARTER 1981

January, February, March 1981

SAMPLE #	DATE SAMPLED	AIR VOLUME m^3	pCi/m^3
		AMES	
266239	01-04-81	1852.1	0.04
266980	01-10-81	1931.0	0.05
1014561	01-16-81	1801.4	0.06
1014563	01-28-81	1791.3	0.07
1014564	02-03-81	1900.4	0.05
1014565	02-09-81	1931.9	0.05
1014589	02-15-81	1836.2	0.12
1014590	02-21-81	1897.5	0.09
1014591	02-27-81	1786.9	0.06
1014592	03-05-81	1848.3	0.15
1014880	03-11-81	1772.1	0.30
1014881	03-17-81	1738.9	0.27
1014882	03-23-81	1690.4	0.22
1015534	03-29-81	1575.5	0.49
		Average of 14	0.14
		DAVENPORT	
266104	01-04-81	1841.9	0.05
266104	01-10-81	1799.3	0.06
1014562	01-16-81	1736.4	0.07
1014847	01-22-81	1636.4	0.13
1014860	01-28-81	1703.9	0.05
266026	02-03-81	1848.7	0.05
1015647	02-09-81	1715.8	0.04
1015441	02-15-81	1676.9	0.19
1015457	02-21-81	1669.9	0.05
1015465	02-27-81	1661.1	0.09
1015756	03-05-81	1674.5	0.13
1015750	03-11-81	1682.4	0.13
1015745	03-17-81	1628.4	0.27
1015742	03-23-81	1571.5	0.13
1015757	03-29-81	1549.8	0.64
		Average of 15	0.14

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TABLE 27 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
GROSS BETA ACTIVITY IN AIR
1ST QUARTER 1981

January, February, March 1981

SAMPLE #	DATE SAMPLED	AIR VOLUME m^3	pCi/m^3
	DUBUQUE		
266265	01-04-81	2050.8	0.05
266266	01-10-81	2141.2	0.14
266267	01-16-81	1988.8	0.05
266268	01-22-81	2020.2	0.13
266269	01-28-81	2183.3	0.08
1014625	02-03-81	2117.5	0.06
1014626	02-09-81	1830.0	0.06
1014627	02-15-81	1756.4	0.19
1014628	02-21-81	1837.7	0.04
1014629	02-27-81	1795.8	0.07
1015239	03-05-81	1948.3	0.15
1015240	03-11-81	1912.8	0.14
1015241	03-17-81	1791.1	0.23
1015242	03-23-81	1736.4	0.17
1015243	03-29-81	1716.3	0.64
		Average of 15	0.15
	COUNCIL BLUFFS		
266244	01-04-81	1904.5	0.06
266248	01-10-81	1911.8	0.08
1014594	01-16-81	1812.7	0.07
1014598	01-22-81	1623.4	0.27
1014602	01-28-81	1712.2	0.05
1014606	02-03-81	1828.5	0.02
1014610	02-09-81	1759.3	0.06
1015139	02-15-81	1725.4	0.16
1015213	02-21-81	1657.3	0.11
1015217	02-27-81	1752.2	0.09
1015221	03-05-81	1846.2	0.11
1015225	03-11-81	1712.4	0.23
1015490	03-17-81	1611.5	0.39
1015501	03-23-81	1655.1	0.24
1015474	03-29-81	1670.4	0.28
		Average of 15	0.15

TABLE 27 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
GROSS BETA ACTIVITY IN AIR
1ST QUARTER 1981

January, February, March 1981

SAMPLE #	DATE SAMPLED	AIR VOLUME m^3	pCi/m^3
	MASON CITY		
266320	01-04-81	2230.0	0.05
1014675	01-10-81	2021.5	0.09
1014667	01-16-81	1996.7	0.06
1014670	01-22-81	1802.8	0.12
1014683	01-28-81	1713.0	0.06
266322	02-03-81	1567.1	0.07
1014679	02-09-81	1519.8	0.10
1015344	02-15-81	1813.6	0.10
1015348	02-21-81	1871.5	0.13
1015141	02-27-81	1831.9	0.04
1015145	03-05-81	1849.2	0.03
1014949	03-11-81	1803.0	0.15
1014677	03-17-81	1793.0	0.15
1015357	03-23-81	1748.1	0.27
1015660	03-29-81	1743.6	0.43
		Average of 15	0.12
	OTTUMWA		
266097	01-04-81	1996.1	0.05
266353	01-10-81	2167.5	0.05
266356	01-22-81	1806.3	0.22
266357	01-28-81	2075.1	0.06
266361	02-03-81	2035.6	0.04
266358	02-09-81	1381.7	0.06
266359	02-15-81	1874.8	0.17
266360	02-21-81	1863.5	0.12
1014832	02-27-81	1741.0	0.11
1014833	03-05-81	1838.4	0.10
1014834	03-11-81	1759.4	0.17
1014835	03-17-81	1697.2	0.20
1014836	03-23-81	1669.2	0.17
1014837	03-29-81	1615.7	0.67
		Average of 14	0.16

TABLE 27 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
GROSS BETA ACTIVITY IN AIR
1ST QUARTER 1981

January, February, March 1981

SAMPLE #	DATE SAMPLED	AIR VOLUME m^3	pCi/m^3
	SIOUX CITY		
266393	01-04-81	1989.1	0.05
266392	01-10-81	2005.2	0.07
266388	01-16-81	2008.3	0.08
1014863	01-22-81	1949.0	0.24
1014871	01-28-81	1966.2	0.05
1014870	02-03-81	2000.8	0.06
1014869	02-09-81	1993.2	0.03
1014878	02-15-81	1924.7	0.15
1015399	02-21-81	1914.0	0.10
1015394	02-27-81	1916.3	0.06
1015396	03-05-81	1897.2	0.14
1015925	03-11-81	1363.5	0.17
1015924	03-17-81	1791.7	0.24
1015739	03-23-81	1997.6	0.18
1015733	03-29-81	1753.4	0.28
		Average of 15	0.13
	WATERLOO		
265930	01-04-81	2181.8	0.04
265931	01-10-81	1970.1	0.08
266133	01-22-81	1914.5	0.08
266134	01-28-81	2140.4	0.05
266135	02-03-81	2133.8	0.08
266136	02-09-81	2100.2	0.04
266140	02-15-81	2122.0	0.14
266141	02-21-81	2109.1	0.06
266142	02-27-81	2073.3	0.16
266143	03-05-81	2119.7	0.11
1014884	03-11-81	1963.7	0.15
1014885	03-17-81	1952.9	0.16
1014886	03-23-81	1868.9	0.16
1014887	03-29-81	1773.5	0.50
		Average of 14	0.13

TABLE 28

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for January 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l ALPHA	pCi/l BETA
Stratford	Hamilton	Well #2, 495'	15057A	05-15-79 11-19-79 12-18-79 12-08-80	0.5	11
Elk Run Hgts.	Black Hawk	Well #1, 125'	15319A	09-24-79 03-31-80 10-22-80	1.9	4
Adams Co. Care Facility	Adams	Well 15'	15702A	12-17-79 03-24-80 06-16-80 10-07-80	1.9	Nil
Coon Rapids	Carroll	Well #2, 87'	15776A	01-15-80 04-14-80 07-14-80 10-14-80	1.1	5
Country Acres	Scott	Well #1, 250'	15823A	01-29-80 03-18-80 06-10-80	1.0	<0.4
Dike	Grundy	Well #1, 295'	15824A	01-28-80 05-13-80 09-11-80 12-03-80	1.5	4

TABLE 28 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for January 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l ALPHA	pCi/l BETA
Blue Grass, Timber Valley Estates	Scott	Well #1, 570'	15841A	02-05-80 05-05-80 08-04-80 11-12-80	1.4	2
Blue Grass, Timber Valley Estates	Scott	Well #2, 573'	15842A	02-05-80 05-05-80 08-04-80 11-12-80	<0.2	1
New Hartford	Butler	Finished	15853A	02-11-80 04-07-80 07-07-80 10-07-80	0.9	1
Harlan	Shelby	Finished	15922A	03-04-80 06-03-80 09-09-80 12-02-80	1.1	3

TABLE 29

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for February 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	pCi/l BETA
Maysville	Scott	Well #1, 160'	14894A	03-27-79 03-18-80 01-12-81	1.4	3
College Springs	Page	Finished, town tap	15044A	05-08-79 11-19-79 04-08-80 12-08-80	0.7	4
Clear Lake	Cerro Gordo	Lot #1, 3, 34, 37	15168A	03-10-80 06-10-80 08-18-80 12-22-80	<0.2	4
Hospers	Sioux	Finished	15309A	06-26-79 08-27-79 04-15-80 12-08-80	<0.3	8
Protivin	Howard	Well 699'	15332A	03-17-80 06-16-80 09-29-80 01-27-81	1.0	10
Algona	Kossuth	Kossuth Co. Care Facility Box 184, R.R. #1 Algona, IA 50511	15390A		0.7	5
Solon	Johnson	Well #2, 230' Twin Valley Lakes Perry Smith, R.R. #4, Solon, IA 52333	15397A	08-06-79 01-10-80 04-25-80 12-16-80	0.3	4

TABLE 29 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for February 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	pCi/l BETA
Mason City	Cerro Gordo	Well 350', Cerro Gordo Co. Care Facility, John R. L. Anderson, Adm., R.R. #1, Mason City	15616A	11-05-79 04-07-80 07-01-80 12-19-80	0.7	3
Lohrville	Calhoun	Well #3, 645'	15814A	01-28-80 06-03-80 09-16-80 12-15-80	1.4	4
Shambaugh	Page	Finished	15818A	01-29-80 06-10-80 07-22-80 12-15-80	1.5	2
Modale	Harrison	Well #2	15833A	01-30-80 04-28-80 08-05-80 01-12-81	0.4	3
Bondurant	Polk	Well #1, 70'	15835A	02-05-80 06-05-80 01-12-81	0.4	6
Grundy Center	Grundy	Well #3, 525'	15859A	02-12-80 05-13-80 08-11-80 12-08-80	1.2	9

TABLE 29 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for February 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	pCi/l BETA
Polk City	Polk	Finished	15885A	02-20-80 06-16-80 10-16-80 01-22-81	1.5	1
Grundy Center	Grundy	Well #1, 200', Clearview Mobile Home Park, Louis F. Hartke, R.R. #1, Grundy Center, IA 50638	15901A	02-26-80 05-27-80 08-25-80 11-25-80	0.9	8
Huxley	Story	Well #3&4, 260'&2600'	15914A	02-27-80 06-09-80 12-01-80	0.9	21
Conway	Taylor	Well #1, 56'	16024A	03-31-80 09-23-80 12-19-80	1.0	3
Anamosa	Jones	Well #1, 405' Amber Water Works Galen H. Harms, Rt. #3, Anamosa, IA 52205	R15868	03-18-80 06-23-80 09-24-80 01-05-81	1.9	7
Long Grove	Scott	Finished	R15870	03-19-80 06-16-80 10-02-80 01-23-81	0.7	3

TABLE 29 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for February 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	pCi/l BETA
Cedar Rapids	Linn	Well 228', Orchard Mobile Home Court, 7100 Mt. Vernon Rd., S.E., Cedar Rapids, IA 52401	R15879	03-11-80 06-06-80 10-10-80 01-09-81	<0.3	4
Dubuque	Dubuque	Well #1, 110', Milton A. Eichman, Box 152, Rt. 1, Dubuque, IA 52001	R15883	03-11-80 06-26-80 09-19-80 01-19-81	<0.2	4
Dexter	Guthrie	Hydrant	R15889	03-24-80 06-30-80 09-30-80 01-12-81	1.7	8
Rockwell City	Calhoun	County Care Facility, Michael Baker, 515 Court, Rockwell City, IA 50579	R15890	03-25-80 06-23-80 09-26-80 01-14-81	<0.2	8
Ames	Story	Well #1, 160', Joe Skaff Crestview Mobile Home Park, R.R. 4, Ames, IA	R15893	03-10-80 06-28-80 09-28-80 01-13-81	<0.2	6
Williams	Hamilton	Well #3, 427'	R15895	03-18-80 06-16-80 09-15-80 12-29-80	0.7	1

TABLE 29 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for February 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	pCi/l BETA
Elk Horn	Shelby	Plant	R15901	03-17-80 06-25-80 09-30-80	<0.2	5
Keswick	Keokuk	Well #1&2, 38'	R15902	04-08-80 07-15-80 10-22-80 01-26-81	0.4	1
Parkersburg	Butler	Well #1&2, 185'&300'	R15906	03-12-80 06-23-80 08-21-80 12-22-80	<0.2	3
Nodaway	Adams	Well #1&2&3, 38'&32'&36'	R15910	03-10-80 06-09-80 09-15-80 12-16-80	0.4	6
Essex	Page	Well #3-4, 60'	R15911	03-10-80 06-24-80 09-30-80 01-14-81	0.9	2
Iowa City	Johnson	Well #1, Sunrise Mobile Home Village, Scott Blvd. Iowa City, IA 52240	R15913	03-11-80 06-16-80 09-16-80 12-19-80	0.5	7

TABLE 29 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for February 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	pCi/l BETA
Mondamin	Harrison	Well #1, 90'	R15915	03-17-80 07-14-80 10-16-80 01-19-81	<0.3	14
Fort Madison	Lee	24 Country Club Lane Robert McGushin	R15916	03-10-80 06-09-80 09-17-80 12-11-80	0.4	4
Plainfield	Bremer	Well #1, 150'	R16063	04-08-80 07-09-80 10-06-80 01-21-81	0.8	2
Laurens	Pocahontas	Well #6, 369'	R16066	04-10-80 07-17-80 10-21-80 01-23-81	1.4	1
Schleswig	Crawford	Distribution System	R16068	04-08-80 07-10-80 10-08-80 01-14-81	1.6	9
Ireton	Sioux	Well #4, 573'	R16268	04-28-80 07-29-80 11-03-80 02-09-81	0.8	15

TABLE 29 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for February 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	pCi/l BETA
Lost Nation	Clinton	Well #1&2, 205'&125'	R16319	05-05-80 08-11-80 11-12-80 02-17-81	0.8	<0.5
Hospers	Sioux	Well #F1, 2, 288' Rural Water System #1 Ronald Still, R.R. 1 Hospers, IA 51238	R17590	02-02-81	0.8	9
Dunkerton	Black Hawk	Finished	R17716	10-15-79 01-14-80 05-28-80 12-17-80	1.4	2
Stuart	Guthrie	Finished Water	15056A	05-14-79 08-13-79 11-13-79 02-19-80	^{90}Sr = 2 pCi/l	

TABLE 30

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for March 1981

OWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
eston	Jackson	Finished Water	15856A	02-11-80 06-30-80 10-20-80 02-09-81	1.9	13		
narlotte	Clinton	Well #1, 400' Clinton Co. Care Facility Alex Manikowski Charlotte, IA	R15869	03-12-80 06-17-80 09-16-80 03-04-81	0.6	1		
uscatine	Louisa	Well Bernard J. Flanders Mobile Home Park P.O. Box 343, Muscatine	R15873	03-13-80 07-30-80 10-28-80 02-17-81	1.2	<0.5		
dependence	Buchanan	Well 65'	R15876	06-28-80 09-02-80 12-01-80 03-01-81	<0.1	1		
ell Rock	Butler	Well #1, 155'; Well #2, 155'	R15892	03-25-80 07-14-80 11-19-80 03-03-81	0.7	<0.5		
oca	Pottawattamie	Finished Water	R15896	03-31-80 08-07-80 11-12-80 02-18-81	0.5	4		

TABLE 30 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for March 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
ddyville	Wapello	Well #1, 36'; #2, 31'	R15898	04-01-80 07-21-80 11-12-80 02-18-81	0.7	1		
anchester	Delaware		R15956	04-11-80 07-21-80 11-12-80 02-18-81	1.9	8		
ilbert	Story	Well #3, 160'	R16260	05-01-80 07-29-80 10-28-80 02-13-81	0.5	13		
raig	Plymouth	Well 200'	R16269	04-28-80 08-05-80 11-04-80 03-03-81	0.9	14		
zelton	Buchanan	Well 69'	R16276	04-28-80 08-04-80 11-12-80 02-17-81	1.7	<0.5		
owan	Wright	Well #1, 225'	R16314	04-30-80 07-24-80 11-05-80 02-09-81	1.9	<0.5		

TABLE 30 (CONTINUED

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for March 1981

...N	COUNTY	IDENTIFICATION	RADIATION #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
...yard	...ossuth	Well #1, 220'	R16318	05-05-80 08-04-80 11-07-80 02-17-81	1.9	1		
...illa	Crawford	Well #1, 85'	R16412	05-20-80 08-26-80 12-01-80 03-09-81	0.9	3		
...bolt	Sac	Well #8, 2200'; Retest	R17124	01-19-81			3.1	1.0
...catine	Muscatine	Retest	R17678	03-10-81	1.2	<0.4		
...catine	Muscatine	Main #1; Retest	R17815	03-10-81	0.5	<0.4		
...catine	Muscatine	Main #3; Retest	R17816	03-10-81	0.5	<0.4		
...catine	Muscatine	Main #2; Retest	R17817	03-10-81	0.3	2		

TABLE 31

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA QUARTERLY RECHECK SAMPLES

OWN	COUNTY	IDENTIFICATION	RADIATION #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
dair	Adair	Well 537'	R17299	12-01-80	4.4	12	4.0	1.5
		Well #1, 2700'	R16767	08-26-80	22	38	5.9	0.7
		Well #1, 2700'	R16356	05-13-80	15.4	30	5.5	1.8
ltoona	Polk	Well #3, 2553'	R17301	11-17-80			3.4	1.2
		Well #3, 2553'	R16769	08-19-80	3.8	8	2.7	<0.6
		Well #3, 2553'	R16281	05-13-80	3.4	8	1.4	<0.6
		Well #3, 2553'	R15665	01-09-80	3.4	10	2.8	3.8
namosa	Jones	Well #4, 1500'	R16768	08-11-80	4.3	Nil	0.8	<0.6
		Well #4, 450'	R16358	05-09-80	1.5	2	0.5	0.7
ox Creek Acres	Dallas	Well #1&2, 505' & 600'	R17460	12-11-80	9.8	39	7.0	1.4
		Well #1&2, 500' & 650'	R17024	09-29-80	16		2.1	1.0
rion	Crawford	Finished	R16751	10-07-80	7.9	7	<0.2	1.1
tkins	Benton	Well #1&2, 485' & 456'	R17298	11-17-80			3.8	1.7
		Well #1&2, 456' & 485'	R16752	08-25-80	6.7	13	4.0	2.1
yard	Guthrie	Well #I, 209'	R17300	11-13-80			2.6	1.8
		Well #I, 205'	R16675	08-13-80	4.8	2	2.0	3.7
		Well #I, 205'	R16114	04-14-80	9.6	12	3.0	5.3
llins	Story	Well #1&3, 505' & 2535'	R17302	12-29-80	1.7	7	3.5	<0.6
		Well #1&3, 508' & 2535'	R16748		7.5	6	2.3	1.9
nville	Des Moines	Well #2, 1200'	R17450	12-08-80	25	19	13.9	1.2
		Well #2, 1200'	R17030	09-24-80	17	24	10.7	2.9
		Well #1&2, 1184'	R16584	06-23-80	29.1	15	10.9	3.6
		Well #1&2, 1184'	R16004	03-24-80	37	42	10.6	4.9

TABLE 31 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA QUARTERLY RECHECK SAMPLES

)WN	COUNTY	IDENTIFICATION	RADIATION #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
)uds	VanBuren	Well #1, 370'	R17456	12-05-80	8.8			
		Well #1, 380'	R17116	10-03-80	11	25		
		Well #1, 380'	R16589	07-03-80	7.7	41	2.8	1.1
		Well #1, 380'	R16046	04-01-80	7.6	29	2.5	1.3
ırlham	Madison	Well #3, 2900'	R17303	11-10-80			8.4	3.3
		Well #3, 2900'	R16771	08-11-80	26	19	8.3	1.3
		Well #3, 2900'	R16360	05-12-80	22.3	42	7.6	3.0
;don	Wapello	Well #1, 1901'	R17446	12-09-80	20	23	19	2.8
			R17062		13	13	6.4	1.0
		Well #1, 1901'	R16582	06-30-80	30.3	42	10.8	<0.6
		Well #1, 1901'	R16002	03-21-80	51	26	13.4	<0.5
·and Junction	Greene	Well #1, 318'	R17304	11-17-80			2.0	2.7
		Well #1, 318'	R16770	08-11-80	1.2	1	0.4	<0.6
		Well #1, 317'	R16362	05-12-80	3.1	16	2.8	4.0
·imes	Polk	Well #1&2, 2650' & 70'	R16850	09-11-80	17	27	4.9	<0.6
·rdy	Humboldt	Well 90'	R17023	09-30-80	7.9	6	5.5	<0.6
rtford	Warren	Well #4, 21.20'	R17296	12-17-80			1.9	0.7
		Well #4, 21.20'	R16851	08-27-80	8.8	13	3.2	0.6
		Well #4, 21.20'	R16352	05-14-80	2.1	11	2.7	1.0
·nestead	Iowa	Well #17, 550'	R17445	12-29-80			4.8	1.5
		Well #17, 750'	R17022	09-23-80	23	8	5.6	0.8
·orte City	Black Hawk	Well #3&4, 250' & 1410'	R17120	10-09-80	5.7	3	1.2	1.5
		Well #3&4, 250' & 1410'	R16744	08-04-80	4.4	25	4.0	2.9
		Well #3&4, 250' & 1410'	R16359	05-08-80	4.0	10	1.4	1.5

TABLE 31 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA QUARTERLY RECHECK SAMPLES

OWN	COUNTY	IDENTIFICATION	RADIATION #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
eMars	Plymouth		R17442	12-09-80			2.2	4.3
			R16935	09-16-80	3.8	9	1.5	2.3
			R16535	06-17-80	4.5	12	0.9	3.9
			R15952	03-14-80	2.7	8	1.4	2.5
eon	Decatur	Well #4, 2815'	R17449	12-22-80	24	14	5.2	3.8
		Well #4, 2815'	R17031	09-29-80	3.4	21	7.1	3.1
		Well #4, 2815'	R16583	06-23-80	9.6	26	6.4	3.1
		Well #4, 2815'	R16003	03-26-80	18	46	7.3	5.1
ockridge	Jefferson	Well #2, 1100'	R17123	10-27-80	16	20	12.6	1.5
aquoketa	Jackson		R17459	12-10-80			1.1	1.8
			R17021	11-04-80			1.3	1.1
arcus	Cherokee	Well #1&2, 1301' & 880'	R17297	11-12-80	12	19	5.9	2.4
		Well #1&2, 1301' & 880'	R16849	08-22-80	9.2	16	7.0	2.3
ason City	Cerro Gordo		R17122	10-06-80	2.3	10	4.8	5.3
aurice	Sioux	Well #1, 520'	R17119	10-07-80	7.2	27	2.4	5.0
		Well #1, 520'	R16746	08-05-80	10.8	15	3.3	3.6
urray	Clarke	Well, 2700'	R16936	09-16-80	18	18	5.4	3.0
evada	Story	Well #3&4, 2630' & 3340'	R17308	11-18-80			6.2	2.5
		Well #3&4, 2630' & 3340'	R16745	08-11-80	14	28	8.5	3.2
ew Albin	Allamakee	Well #1, 570'	R17443	12-09-80			1.8	3.1
		Well #1, 570'	R16864	09-09-80	4.7	5	2.5	4.3
		Well #1, 570'	R16353	06-02-80	6.3	5	2.6	4.1
Jebolt	Sac	Well #8, 2200'	R17025	10-06-80	32	Nil	6.5	3.2

TABLE 31 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA QUARTERLY RECHECK SAMPLES

TOWN	COUNTY	IDENTIFICATION	RADIATION #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Remsen	Plymouth		R17034	10-07-80	1.6	1	0.2	2.7
			R16357	06-23-80	3.3	3	0.2	<0.6
St. Paul	Lee	Well #1	R16747	08-04-80	11	12	3.9	<0.6
Salem	Henry	Well #4, 1800'	R17431	11-24-80	25	--	6.9	1.4
		Well #4, 1800'	R16708	09-13-80	16	9	9.7	2.0
			R16062	04-21-80	17	27	7.7	2.3
Sergeant Bluff	Woodbury	Well #1, 456'	R17294	12-03-80			5.5	5.6
		Well #1, 456'	R16863	09-02-80	4.8	15	3.9	4.2
		Well #1, 456'	R16354	06-02-80	3.3	33	3.0	4.7
Sioux City	Woodbury	Spaulding Plant	R17451	12-23-80			1.7	3.1
		Zenith Plant	R17452	12-29-80			1.5	0.9
		Spaulding Plant	R17028	09-29-80	5.9	7	2.2	3.7
		Zenith Plant	R17027	09-29-80	4.3	6	1.5	2.7
		Zenith Plant	R16533	06-20-80	1.9	9	1.1	3.0
		Spaulding Plant	R16532	06-20-80	5.5	5	1.6	1.8
		Spaulding Plant	R15990	03-19-80	2.0	10	1.9	2.5
		Zenith Plant	R15989	03-19-80	4.8	10	2.2	5.3
		Zenith Plant	R15833		1.5	19	1.7	1.8
		Spaulding Plant	R15832	02-25-80	2.5	12	2.9	3.9
		Spaulding Plant	R15369	09-26-79	2.1	8		
		Zenith Plant	R15368	09-26-80	<0.2	7		
State Center	Marshall	Well #5	R17306	11-13-80			<0.26	<0.6
		Well #5, 2950'	R16766	08-11-80	2.0	32	1.0	<0.6
		Well #5, 2950'	R16355	05-13-80	13.4	18	5.0	2.4
Stuart	Guthrie	Well #3, 2800'	R17307	11-10-80	16	25	9.3	3.6
		Well #3, 2800'	R16749	08-11-80	25	43	8.7	1.2

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TABLE 31 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA QUARTERLY RECHECK SAMPLES

TOWN	COUNTY	IDENTIFICATION	RADIATION #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
ully	Jasper	Well #1, 2240'	R17033	09-26-80	7.9	26	5.2	1.8
		Well #1, 2240'	R16534	06-24-80	31.2	Nil	5.7	2.5
		Well #1, 2238'	R15951	03-17-80	16	28	6.5	4.1
oledo	Tama	Well #7, 2016'	R17557	01-13-81			<0.1	0.6
		Well #7, 2016'	R17121	10-27-80			3.5	3.5
		Well #8, 1950'	R16750	07-30-80	13	18	3.9	<0.6
ashington	Washington		R17117	10-06-80	11	26	5.8	2.4
			R16674	07-14-80	15	29	5.4	1.0
			R16028	04-17-80	3.6	6	4.4	2.4
			R16118	03-19-80	4.4	30	5.7	2.2
ellman	Washington	Well #3-Jordan, 1700'	R17448	12-15-80			9.0	2.0
		Well #3, 1700'	R17140	09-29-80	14	21	5.0	2.3
		Well Jordan, 1700'	R16536	06-24-80	3.6	13	2.7	2.9
80		Well Jordan, 1700'	R16536	06-24-80	10.7	22	4.1	3.6
		Well Jordan, 1700'	R16536	06-24-80	12.3	19	5.5	2.5
		Well #3, 1700'	R15953	03-17-80	7.1	26	6.0	0.6
ellsburg	Grundy	Well #1, 2050'	R17295	11-24-80			5.4	4.2
		Well #1, 2050'	R16862	09-03-80	9.8	25	3.3	3.7
		Well #1, 2050'	R16361	06-03-80	24.9	Nil	3.5	4.4
est Bend	Palo Alto	Well #4, 1360'	R16937	10-01-80	9.2	18	5.6	3.6
est Point	Lee	Well #3, 1900'	R17309	12-03-80			10.1	<0.6
		Well #3, 1900'	R16728	07-30-80	9.6	33	8.2	2.7

Table 32

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
IOWA QUARTERLY RECHECK SAMPLES
Data for March 1981

OWN	COUNTY	IDENTIFICATION	RADIATION #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
. Paul	Lee	Well	R17110	01-19-81	23	31	6.4	2.3
nemosa	Jones	Well #4, 450'	R17305	02-12-81			0.6	<0.5
urray	Clarke	Well 2700'	R17441	01-06-81			5.1	3.2
rimes	Polk	Well #1, 2650'; #2, 72'	R17444	12-16-80	7.4	19	3.4	2.1
est Bend	Palo Alto	Well #4, 1360'	R17454	01-27-81	5.6	18	5.5	3.1
rion	Crawford		R17455	01-05-81	5.2	6	<0.3	<0.6
ssen	Plymouth	Well #3-5, 30'	R17457	01-12-81			0.3	<0.6
shington	Washington	Finished dozer	R17552	01-12-81			5.2	2.5
urice	Sioux	Well #1, 520'	R17553	01-10-81			1.8	3.3
Porte City	Black Hawk	Well #3, 250'; #4, 1410'	R17554	01-15-81			2.3	2.4
uart	Guthrie	Well #3, 2800'	R17692	02-12-81	27	50	6.2	<0.6
rcus	Cherokee	Well #1, 1301'; #2, 4880'	R17693	02-11-81	18	21	7.3	<0.6
yard	Guthrie	Well #2, 109'	R17694	02-18-81			2.3	4.8
rlin	Madison	Well #3, 2900'	R17695	02-10-81			2.7	2.9
wada	Story	Well #3, 3340'; #4, 2630'	R17696	02-09-81			5.9	5.1
ate Center	Marshall	Well #5, 2950'	R17697	02-09-81			<0.2	<0.6

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TABLE 32 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA QUARTERLY RECHECK SAMPLES

Data for March 1981

TOWN	COUNTY	IDENTIFICATION	RADIATION #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	[illegible]Ra	228R
Grand Junction	Greene	Well #1, 318'	R17698	02-13-81			0.4	0.7
Atkins	Benton	Well #1, 456'; #2, 485'	R17699	02-17-81			3.1	0.9
Wellsburg	Grundy	Well #1, 2050'	R17700	03-11-81			5.4	4.0
West Point	Lee	Well #3, 1900'	R17701	02-18-81			7.9	<0.6
Sergeant Bluff	Woodbury	Well #1, 456'	R17702	03-09-81			4.5	4.0
Salem	Henry	Well #4, 1820'	R17773	02-09-81	25	19	7.4	2.4
Maquoketa	Jackson		R17820	03-10-81			2.7	3.3
Wellman	Washington	Well Jordan, 1700'	R17823	03-16-81			4.7	2.0
Sully	Jasper	Well #1, 2240'	R17824	03-09-81	11	43	9.5	3.2
Eldon	Wapello	Well #1, 1901'	R17825	03-09-81	2.3	17	1.3	1.9
Homestead	Iowa	Well #17, 550'	R17826	03-17-81			4.1	1.7
Grimes	Polk	Well #I, 2650'; #II, 70'	R17827	03-09-81			3.8	1.3
New Albin	Allamakee	Well #1, 570'	R17828	03-16-81			2.2	3.1
Collins	Story	Well #1, 2535'; #3, 505'	R17829	03-11-81			3.0	3.1
Sioux City	Woodbury	Spalding Plant	R17830				2.6	1.5
Sioux City	Woodbury	Zenith Plant	R17831	03-11-81			1.2	3.0
Murray	Clarke	Well #Jordan, 2700'	R17832	03-13-81			6.2	3.1

TABLE 33

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES

Data for January 1981

TOWN	COUNTY	IDENTIFICATION	LAB # or MINERAL #	DATE SAMPLED	pCi/l		
					ALPHA	BETA	^{226}Ra
Cedar Rapids	Linn	Well #10E, FEE	3392	12-03-80	0.3	<0.5	
Odebolt	Sac	Well #8, 2131'	15796	01-22-80	28	45	8.4
Smithland	Woodbury	Well #1, 65'	15827		8.3	10	4.5
Winfield	Henry	Well #2, 1980'	15892	02-25-80	13	8	15
LaMotte	Jackson	Well #2, 170'	15904	02-27-80	3.2	1	0.2
Gillett Grove	Clay	Raw Water #1	15979	03-17-80	14	Nil	0.1
Manson	Calhoun	Ground Water	16009	03-26-80	4.9	Nil	0.4
Bussey	Mahaska	Well #3, 2265'	16037	04-08-80	29	29	12
Hawarden	Sioux	Raw Water, Well #5	16168	05-06-80	6.7	8	1.4
Quimby	Cherokee	Well #1, 225'	16210	05-13-80	4.3	1	1.8
Audubon	Audubon	Well #16	16212	05-13-80	3.1	2	0.5
Audubon	Audubon	Well #14	16213	05-13-80	3.3	Nil	0.3
Marshalltown	Marshall	Well #8, 223'	16216	05-15-80	7.9	Nil	0.5
Marathon	Buena Vista	Well #2, (Formerly #4)	16237	05-23-80	3.6	7	0.2
High Amana	Iowa	Well #10, 40'	16251	06-03-80	6.7	1	0.2
Bristow	Butler	Well #2, 180'	16263	06-05-80	5.9	2	0.6

TABLE 33 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES

Data for January 1981

TOWN	COUNTY	IDENTIFICATION	LAB # or MINERAL #	DATE SAMPLED	pCi/l		
					ALPHA	BETA	^{226}Ra
Woodbine	Harrison	Test Hole Well Field	16264	06-03-80	3.1	12	0.5
Brunsville	Plymouth	Well #1, 32'	16267	06-05-80	4.1	5	0.4
Remsen	Plymouth	Well #7, 417'	16269	06-05-80	7.3	12	4.2
Vinton	Benton	Well #2, 1505'	16273	06-10-80	3.1	18	3.4
Vinton	Benton	Well #3, 118'	16274	06-10-80	3.0	Nil	0.4
Oto	Woodbury	Well #2, 65'	16375	07-10-80	8.3	3	0.6
Alden	Hardin	Well #1, 320'	16414	07-23-80	3.6	4	2.1
Livermore	Humboldt	Well #2, 227'	16424	07-24-80	3.9	8	3.1
Walnut	Pottawattamie	Well #1, 2511'	16509	08-27-80	8.0	15	3.7
Adel	Dallas	Well #4, 50'	16620	10-28-80	2.6	6	
Eldridge	Scott	Well #3, 495'	16625	10-29-80	0.3	2	
Dallas Center	Dallas	Well #4, 50'	16628	10-31-80	<0.2	<0.5	
Dallas Center	Dallas	Well #2, 50'	16629	10-31-80	9.2	<0.5	0.3
Cedar Rapids	Linn	Well #9 West, FEE	16674	11-11-80	0.5	<0.5	
Rake	Winnebago	Well #1, 157'	16687	11-17-80	0.5	7	
Lacona	Warren	Well #3	16691	11-19-80	<0.2	1	

TABLE 33 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES

Data for January 1981

TOWN	COUNTY	IDENTIFICATION	LAB # or MINERAL #	DATE SAMPLED	pCi/l		
					ALPHA	BETA	^{226}Ra
Cedar Rapids	Linn	Well #11 Seminole	16696	11-19-80	1.7	1	
Keystone	Benton	Well #1, 1360'	16700	11-24-80	2.6	17	
Elberon	Tama	Well #1	16704	12-02-80	7.1	10	1.8
Ames	Story	FEE, Layne Western, 705 S. Duff, Ames 50010	16708	12-03-80	<0.2	<0.5	
Clay Co. Rural Water District	Clay	Well #3, 32', FEE Nichols Well Service R.R. #1, Box 281 Sioux City, IA 51108	16710	11-08-80	0.7	<0.5	
St. Marys	Warren	Well #2,	16713	12-10-80	<0.2	Nil	
Malvern	Mills	Well #10, 59.5'	16716	12-10-80	<0.2	5	
Malvern	Mills	Well #11, 56'	16717	12-10-80	1.9	4	

TABLE 34

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES

Data for February 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l ALPHA	pCi/l BETA	pCi/l ^{226}Ra
Hartley	O'Brien	Well #3, 390'	15846	02-08-80	4.0	22	1.4
Bridge Water	Adair	Well #1, 43'	15863	02-14-80	6.8	Nil	0.3
Goldfield	Wright	Well #2, 370'	15867	02-14-80	6.0	1	3.3
Peterson	Clay	Well #2, 101'	15869	02-14-80	6.7	2	0.4
Belmond	Wright	Well #2	15871	02-14-80	3.4	14	0.9
West Bend	Palo Alto	Well #4	15876	02-18-80	19.1	14	7.7
Pocahontas	Pocahontas	Well #3	15878		8.4	9	2.8
Manilla	Crawford	Well #1, 83'	15905	02-27-80	3.2	2	1.3
Manilla	Crawford	Well #2	15906	02-27-80	4.7	4	1.0
Winterset	Madison	Well #1, shallow well	15927	03-06-80	5.9	1	0.3
Shelby	Shelby	Well #2, 50'	15931	03-06-80	4.4	1	0.4
Hamburg	Fremont	Well #3	15935	03-06-80	7.6	11	1.1
Farley	Dubuque	Well #1, 190'	15958	03-12-80	3.6	1	0.4
Farley	Dubuque	Well #2, 1220'	15959	03-12-80	3.3	14	3.2
Varina	Pocahontas	Ground water	15995	03-21-80	3.2	11	1.4
Keota	Keokuk	Well #3	15997		14.0	26	7.5

TABLE 34 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES

Data for February 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l		
					ALPHA	BETA	RADIUM
Osage	Mitchell	Well #5, 1964'	16011	03-26-80	3.5	7	1.7
Sabula	Jackson	Well #1, 1100'	16044	04-08-80	3.2	6	1.3
Gruver	Emmet	Well #1	16114	04-23-80	9.1	5	0.6
Dolliver	Emmet	Well #3	16115	04-23-80	23	Nil	0.4
Hamburg	Fremont		16131	04-28-80	15	Nil	0.6
LaPorte City	Black Hawk	Well #4, 1410'	16194	05-13-80		15	4.4
Adair	Adair	Well #68-1, 2700'	16198	05-13-80		62	11
Audubon	Audubon	Well #17	16204	05-13-80	5.9	Nil	0.4
Pierson	Woodbury	Well #1, 26'	16407	07-21-80	3.5	6	0.2
Oxford Junction	Jones	Well #2, 50'	16425	07-24-80	11	Nil	0.2
Crawfordsville	Washington	Well #3, 1513'	16427	07-24-80	3.4	21	2.8
Akron	Plymouth	Well #5, 47'	16443	07-24-80	3.8	5	0.1
Monroe	Jasper	Well #1-80, 300', Layne Western Co., 705 S. Duff, Ames, IA 50010	16445	07-30-80	11	Nil	1.2
LeGrand	Marshall	Well #4, 22'	16451	07-31-80		24	6.2

TABLE 34 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES

Data for February 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l ALPHA	pCi/l BETA	pCi/l ^{226}Ra
Sloan	Woodbury	Well New, 100', Mitch L. Nichols, Nichols Well Service, R.R. #1, Box 281, Sioux City, IA 51108 FEE	16727	12-12-80	<0.3	1	
Prescott	Adams	Well #2, 48', Banks Well Co., Inc., R.R. 1, Box 7, St. Charles, IA 50240 FEE	16787	01-21-81	1.9	4	
New Sharon	Mahaska	Well #2, 60', Junior Fisher, New Sharon, IA FEE	16822	01-26-81	1.1	1	
Casey	Guthrie	Well 41', Banks Well Co., Inc. R.R. 1, Box 7, St. Charles, IA 50240 FEE	16833	01-28-81	1.4	4	

TABLE 35

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES

Data for March 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
Marcus	Cherokee	Well #1	15889	01-21-80	22	23	3.4	
Marcus	Cherokee	Well #2	15890	01-21-80	9.5	38	7.7	
Arcadia	Carrol	Arcadia MWS	15898	02-26-80	20	74	8.3	
Manilla	Crawford	Well #3, 82'	15902	02-27-80	3.7	7	1.1	
Coralville	Johnson	Well #1, Jordan Well	15912	02-28-80	7.1	12	3.7	
Huxley	Story	Well #4, 2600'	15920	03-04-80	17	35	9.1	
Brighton	Washington	Well	15930	03-03-80	17	7	3.4	
Hamburg	Fremont	Well #5, 70'	15936	03-06-80	4.7	5	1.0	
Havelock	Pocahontas	Ground water	15950	03-10-80	3.6	16	2.1	
Farley	Dubuque	Well #3, 1330'	15960	03-12-80	3.0	11	2.1	
Morning Sun	Louisa	Well	15964	03-13-80	11	1	4.8	
Paullina	O'Brien	Well #3	15978	03-17-80	3.4	Nil	0.1	
Royal	Clay	Well #3	15980	03-17-80	5.9	3	0.8	
West Branch	Cedar	Well #4, 440'	15999	03-25-80	6.0	1	1.5	
Klemme	Hancock	Well #2, 380'	16001	03-25-80	6.9	15	4.3	
Cushing	Woodbury	Well #1	16014	03-27-80	3.2	9	0.3	

TABLE 35 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEEP MINERAL SAMPLES

Data for March 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l ALPHA	BETA	Ra	22
Thronton	Cerro Gordo	Well #1, 540'	16022	04-01-80	3.0	11	1.8	
Dayton	Webster	Well #3, 1250'	16026	04-01-80	3.9	2	0.8	
Center Point	Linn	Well #4, 470' Layne Western Co. Ames, IA	16029	04-02-80	3.6	7	1.2	
Knoxville	Marion	Well #1, 2580'	16034	04-07-80	3.7	19	5.6	
Knoxville	Marion	Well #2, 2390'	16035	04-07-80	9.0	23	4.1	
Iowa City	Johnson	Surface Water	16038	04-08-80	4.5	4	0.6	
Iowa City	Johnson	Well #1, 1568'	16039	04-08-80	8.3	30	2.7	
Rossie	Clay	Clay Central School	16062	04-15-80	16	13	2.6	
Webb	Clay	Webb Water Supply	16063	04-15-80	7.8	30	3.0	
Nevada	Story	Well #3, Jordon	16178	05-08-80	17	30	9.3	
Dickens	Clay	Wellhouse	16181	05-07-80	4.2	9	0.6	
Adair	Adair	Well #39-1, 1700'	16197	05-13-80	3.2	27	2.4	
Melvin	Osceola	Well #1, 37'	16283	06-11-80	3.5	Nil	0.5	
Cherokee	Cherokee	Well #8, 270'	16302	06-19-80	26	18	2.8	
Clinton	Clinton	Well #1	16309	06-25-80	3.2	9	<0.1	

TABLE 35 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES

Data for March 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}
St. Anthony	Marshall	Well #1, 438' Osweiler	16370	07-14-80	12	6	1.5	
Altoona	Polk	Well #3, Jordan	16371	07-14-80	4.4	23	6.7	
Arthur	Ida	Well #1, 24'	16374	07-10-80	4.9	Nil	0.1	
Westfield	Plymouth	Well #2, 33' Nichols Well Service R.R. #1, Box 281 Sioux City, IA 51108	16439	12-30-80	2.9	5	<0.1	0.9
LeGrand	Marshall	Well #2, 2100'	16450	07-31-80	3.5	Nil	<0.1	
Keosauqua	Van Buren	Well #3, 1850'	16459	07-31-80	7.8	22	1.9	
Merrill	Plymouth	Well #2, 42½'	16485	08-12-80	5.9	6	0.2	
Arion	Crawford	Well #1, 40'	16499	08-20-80	7.8	Nil	0.1	
Arion	Crawford	Well #2, 62'	16500	08-20-80	6.1	9	0.4	
Ute	Monona	Well #2, 57'	16511	08-29-80	3.1	5	0.4	
Craig	Plymouth	Well #2	16513	09-03-80	3.2	9	2.9	
Hinton	Plymouth	Well #2	16514	09-03-80	5.6	4	0.1	
Ackley	Hardin	Well #2, 1917'	16516	09-03-80	3.6	26	4.7	
Sheldon	O'Brien	Well #10	16519	09-08-80	5.7	8	0.5	

TABLE 35 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEC MINERAL SAMPLES

Data for March 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{2}
Clutier	Tama	Well #1, 290'	16544	09-23-80	8.0	15	0.3	
Mondamin	Harrison	Well #1, 96'	16553	09-24-80	3.0	9	0.8	
Woodbine	Harrison	Well #1, 95'	16563	09-26-80	3.6	10	0.8	
Logan	Harrison	Well #5, 47'	16565	09-20-80	4.5	7	0.2	
Coats Subdivision	Webster	Well #2, 550'	16567	09-30-80	3.3	1	2.4	
Coats Subdivision	Webster	Well #1, 400'	16568	09-30-80	4.2	12	2.1	
Ackley	Hardin	Well #1, 180'	16570	09-29-80	3.5	5	1.8	
Clay Co. Rural Water System	Clay	Well #3, FEE Nichols Well Service R.R. #1, Box 231 Sioux City, IA 51108	16582	09-24-80	2.4	2	0.2	<0.
Washington	Washington	Well #7, 1835'	16586	10-10-80	7.4	17	5.4	
Swea City	Kossuth	Well #2, 278'	16603	10-21-80	3.6	1	1.6	
Mo Valley	Harrison	Well #1, 87'	16605	10-20-80	4.4	8	0.2	
Mo Valley	Harrison	Well #2, 90'	16606	10-20-80	4.8	11	0.3	
Titonka	Kossuth	Well #2, 300'	16609	10-22-80	4.2	6	3.0	
Titonka	Kossuth	Well #1, 300'	16610	10-22-80	7.0	4	2.6	
Adel	Dallas	Well #3, 60'	16619	10-28-80	5.6	6	0.5	

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TABLE 35 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES
Data for March 1981

Reproduced from best available copy.

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	?
Stuart	Adair	Well #3, 2800'	16643	11-06-80	22	28	8.9	
Rake	Winnebago	Well #2, 147'	16686	11-17-80	5.5	<0.5	1.8	
Galt	Wright	Well #1, 146'	16718	12-15-80	13	7	9.2	
Randall	Hamilton	Well #1, 347'	16719	12-15-80	3.5	7	5.0	
Jefferson	Green	Well #6, 157'	16728	12-22-80	4.1	<0.5	1.4	
Webster City	Hamilton	Well #6, 2000'	16729	12-29-80	9.1	24	6.8	
Bellevue	Jackson	Well #1, 1500'	16730	12-30-80	2.1	7		
Bellevue	Jackson	Well #2, 1500'	16731	12-30-80	5.1	3	3.0	
Rockwell	Cerro Gordo	Well #2, 459'	16732	01-06-81	1.3	10		
Rockwell	Cerro Gordo	Well #1, 464'	16733	01-06-81	3.5	10	1.4	
Cambridge	Story	Well #2, 80'	16734	01-06-81	<0.1	1		
Farragut	Fremont	Well #79-1, 62'	16741	01-07-81	1.2	7		
Farragut	Fremont	Well #79-2, 62½'	16742	01-07-81	2.3	6		
Riverton	Fremont	Well #1, 57'	16743	01-07-81	7.2	12	0.9	
Fertile	Worth	Well #1, 240'	16748	01-09-81	1.5	4		
Burt	Kossuth	Well #1, 560'	16749	01-06-81	2.5	14		

TABLE 35 (CONTINUED)
UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES
Data for March 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{224}
Burt	Kossuth	Well #2, 560'	16750	01-06-81	1.6	15		
Coggon	Linn	Well #1, 247'	16757	01-14-81	1.2	1		
Coggon	Linn	Well #2, 247'	16758		1.7	4		
Mingo	Jasper	Well #1	16759		2.5	7		
Kensett	Worth	Well #1, 250'	16761	01-15-81	2.3	<0.4		
Kensett	Worth	Well #2, 305'	16762	01-15-81	1.7	3		
Bondurant	Polk	Well #1, 70'	16768	01-19-81	2.2	7		
Central City	Linn	Well #1, 102'	16769	01-19-81	<0.1	4		
Central City	Linn	Well #2, 103'	16770	01-19-81	0.7	9		
Milo	Warren	Well #3	16772	01-20-81	3.9	19	3.8	
Leland	Winnebago	Well #1	16779	01-20-81	3.4	5	2.8	
Sidney	Fremont	All Wells	16784	01-21-81	<0.1	5		
Sidney	Femont	Well	16785	01-12-81	1.4	2		
Russell	Lucus	Well #1, Jordan	16795	01-23-81	5.8	26	4.4	
Shell Rock	Butler	Well #1, 160'	16796	01-22-81	1.9	5		
Shell Rock	Butler	Well #2, 160'	16797	01-22-81	0.8	1		

TABLE 35 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEEP MINERAL SAMPLES

Data for March 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l ALPHA	pCi/l BETA	pCi/l ^{226}Ra	pCi/l ^{228}Ra
McCallsburg	Story	Well #1, 1136'	16798	01-26-81	2.2			
McCallsburg	Story	Well #2, 652'	16799	01-26-81	1.5	3		
Roland	Story	Well #North	16800	01-26-81	0.3	7		
Thurman	Fremont	Well #1, 115'	16824	01-27-81	1.8	10		
Earlville	Delaware	Well #2, 200'	16834	01-29-81	2.8	5		
Earlville	Delaware	Well #1, 187'	16835	01-29-81	1.3	6		
Hiawatha	Linn	Well #2, 235'	16838		1.7	<0.4		
Hiawatha	Linn	Well #4, 200'	16839	02-02-81	0.6	2		
Columbus City	Louisa	Well #1, 165'	16846	02-03-81	0.4	1		
Floyd	Floyd	Well #1, 193'	16847	02-03-81	1.5	1		
Floyd	Floyd	Well #2, 275'	16848	02-03-81	1.0	1		
Ely	Linn	Well #1, 460'	16867	02-09-81	1.1	1		
Dubuque	Dubuque	Well #8, 1800' City Water Department City Hall Dubuque, IA	16876	02-09-81	3.1	11	3.0	
Dubuque	Dubuque	Well #6, 1500' City Water Department City Hall Dubuque, IA	16877	02-09-81	1.9	9		

TABLE 35 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEEP MINERAL SAMPLES
Data for March 1981

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l ALPHA	pCi/l RA
Dubuque	Dubuque	Well #4, 190' City Water Department City Hall Dubuque, IA	16878	02-09-81	2.9	1
Dubuque	Dubuque	Well #5, 1800' City Water Department City Hall Dubuque, IA	16879	02-09-81	2.4	6
St. Ansgar	Mitchell	Well #1, 240'	16884	02-12-81	2.3	2
St. Ansgar	Mitchell	Well #2, 200'	16885	02-12-81	0.6	2
Victor	Iowa	Well #2, 350'	16891	02-17-81	0.7	10
Meservey	Cerro Gordo	Well #1, 573'	16895	02-18-81	1.2	5
Dawson	Dallas	Well #1	16898	02-19-81	0.8	3
Hopkinton	Delaware	Well #1, 1215'	16899	02-23-81	2.1	10
Ames	Story	LTI Construction R.R. #4 Ames, IA	16806	02-24-81	1.2	9
Fort Dodge	Webster	Well #15, 2307' F. J. Donovan Utilities Dept. Municipal Bldg. Fort Dodge, IA 50501	16907	02-24-81	2.8	3

TABLE 35 (CONTINUED)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES

Data for March 1981

TOWN	COUNTY	IDENTIFICATION	LAB # OR MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Luther	Boone	Well #1, 700'	16909	02-25-81	2.5	9		
Hazelton	Buchanan	Well #1, 65'	16911	02-25-81	0.7	<0.4		
Hazelton	Buchanan	Well #2, 69'	16912	02-25-81	0.8	3		
Leighton	Mahaska	Well #4	1120	08-22-80	17	24	11	4.3
Leighton	Mahaska	Finished Water	1121	08-22-80	33	10	8.4	3.2

TABLE 36

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
CONCENTRATIONS OF ^{90}Sr IN IOWA MILK SAMPLES

Data for 1st Quarter, 1981

TOWN	DATE OF SAMPLE	RADIATION NO.	^{90}Sr, pCi/l	
Iowa City	01-20-81	R17608	3.7	
Iowa City	01-20-81	R17608	4.9	]Avg. 4.3
Iowa City	02-03-81	R17714	3.8	
Iowa City	02-03-81	R17714	4.0	]Avg. 3.9
Iowa City	02-17-81	R17787	3.2	
Iowa City	02-17-81	R17787	2.9	]Avg. 3.0
LeMars	02-13-81	R17775	2.6	
Iowa City	03-03-81	R17843	2.8	
Iowa City	03-03-81	R17843	3.3	]Avg. 3.0
Iowa City	03-17-81	R17900	3.5	
Iowa City	03-31-81	R17951	3.4	
LeMars	03-26-81	R17955	1.9	